THE IMPACT OF FISCAL DEFICITS ON ECONOMIC GROWTH IN DEVELOPING COUNTRIES: EMPIRICAL EVIDENCE AND POLICY IMPLICATIONS

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Abstract

This study examines the impact of fiscal deficits on economic growth in developing countries. Based on deduction from the relevant theoretical and empirical literature, the study tests the following hypotheses regarding the impact of fiscal deficits on economic growth. First, fiscal deficits have significant positive or negative impact on economic growth in developing countries. Second, the impact of fiscal deficits on economic growth depends on the size of deficits as a percentage of GDP – that is, there is a non-linear relationship between fiscal deficits and economic growth. Third, the impact of fiscal deficits on economic growth depends on the ways in which deficits are financed. Fourth, the impact of fiscal deficits on economic growth depends on what deficit financing is used for. The study also examines whether there are any significant regional differences in terms of the relationship between fiscal deficits and economic growth in developing countries.

The study uses panel data for thirty-one developing countries covering the period 1972-2001, which is analysed based on the econometric estimation of a dynamic growth model using the Arellano and Bond (1991) generalised method of moments (GMM) technique. Overall, the results suggest the following. First, fiscal deficits per se have no any significant positive or negative impact on economic growth. Second, by contrast, when the deficit is substituted by domestic and foreign financing, we find that both domestic and foreign financing of fiscal deficits exerts a negative and statistically significant impact on economic growth with a lag. Third, we find that both categories of economic classification of government expenditure, namely, capital and current expenditure, have no significant impact on economic growth. When government expenditure is disaggregated on the basis of a functional classification, the results suggest that spending on education, defence and economic services have positive but insignificant impact on growth, while spending on health and general public services have positive and significant impact. Fourth, in terms of regional differences with regard to the estimated relationships, the study finds that, while there are some regional differences between the four different regions represented in our sample of thirty-one developing countries - namely, Asia and the Pacific, Latin America and the Caribbean, Middle East and North Africa, and Sub-Saharan Africa – these differences are not statistically significant.

On the basis of these findings, the study concludes that fiscal deficits per se are not necessarily good or bad for economic growth in developing countries; how the deficits are financed and what they are used for matters. In addition, the study concludes that there are no statistically significant regional differences in terms of the relationship between fiscal deficits and economic growth in developing countries.

Keywords: Fiscal Deficits, Economic Growth, Developing Countries, Panel Data, GMM

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DEDICATION

To my family, who offered me unconditional love and support throughout the course of doing this research.

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INTRODUCTION

1.1 Background

Over the past few decades, fiscal deficits have been at the forefront of macroeconomic reforms in both developed and developing countries. In developing countries, in particular, governments have been urged to reduce fiscal deficits as one of the measures to lead them out of the economic malaise many have experienced such as unsustainable levels of public debt, high inflation, balance of payments problems, poor investment and low economic growth. In fact, international development agencies, such as the World Bank (WB) and the International Monetary Fund (IMF), and donor countries have required many governments in developing countries to reduce the size of fiscal deficits as one of the pre-conditions for obtaining development aid and other forms of economic assistance (Tarp, 1993; Easterly and Schmidt-Hebbel, 1994; Nelson and Singh, 1994; Jha, 2003).

On the other hand, however, debate remains about the effect of fiscal deficits on economic performance. Since the Keynesian revolution in macroeconomics, many economists and policy makers have argued that deficit spending can be used as one of the effective measures to promote economic growth and employment (Chrystal and Thornton, 1988). This view of deficit spending is based on the well-known Keynesian premise that the market economy left to itself will not always be able to sustain aggregate demand at a level consistent with full employment. Keynesian economists have particularly argued for the need to use government budget deficits as one of the corrective measures to fight poor economic growth and high levels of unemployment in industrialised countries during economic downturns. In the context of developing countries, too, some economists and policymakers have argued that deficit spending would be an effective economic policy tool to promote economic growth and employment given the large amount of unemployed and underemployed human and other economic resources that exist in most of these countries (Nelson and Singh, 1994). Indeed, as Nelson and Singh further argue, if used wisely, such fiscal policy action would help developing countries to invest in much-needed infrastructure and other development projects.

However, the Keynesian view of deficit spending policy has been challenged over the years by two other theoretical viewpoints. The first is the Neo-classical viewpoint in which it is argued that deficit spending has little or no effect on employment and economic growth, and that it primarily results in a re-distribution of resources from the private sector to the public sector through the so-called crowding-out effect. Proponents of this viewpoint also warn of the potentially harmful macroeconomic effects of running high levels of public sector debt caused by deficit spending policy (Chrystal and Thornton, 1988; Bernheim, 1989).

The second viewpoint that has challenged the Keynesian analysis of fiscal deficits is the so-called Ricardian theory (also known as the Ricardian Equivalence Hypothesis) which argues that deficit spending policy has no real economic effects.[1] According to this theory, government debt generated through borrowing to finance deficit spending will in the long run be paid-off by future tax increases, and far-seeing taxpayers, who also care enough about their future prosperity and the prosperity of future generations, would foresee this tax increase and therefore adjust their present consumption and savings accordingly (Bernheim, 1989).[2] This means that the stimulative effects of deficit spending policy on aggregate demand will be offset by a shift away from current consumption and in to current savings, thus leaving net aggregate demand unchanged. Consequently, with no change in aggregate demand, there will be no real economic effects - that is, deficit spending policy will have no effect on output and other macroeconomic variables (Barro, 1989; Bernheim, 1989; Fischer and Easterly, 1990; Saleh, 2003).

1.2 Research Problem

Despite the ongoing pressure by the international development agencies and donor countries on developing countries to reduce the size of budget deficits and the debate on the effect of fiscal deficits on economic performance, there is still a lack of detailed empirical investigation on the effect of fiscal deficits on economic performance in developing countries. As Nelson and Singh (1994) argue, literature

[1] The Ricardian theory was originally introduced by David Ricardo and later developed by the American economist Robert Barro.

[2] This Ricardian analysis of deficit spending policy is based on a number of assumptions such as (1) consumers/taxpayers are rational and farsighted; (2) successive generations of consumers are linked by altruistically motivated transfers; (3) all taxes are non-distortionary – among others (Bernheim, 1989, p. 63)

shows that most of the existing empirical studies on this topic have focused much on the developed countries, particularly the United States.[3] This study, therefore, aims to contribute in filling an important existing gap in the empirical literature on the impact of fiscal deficits on economic performance in developing countries. In doing this, the study particularly examines the specific case of the impact of fiscal deficits on economic growth.

In addition, a critical analysis of the few existing empirical studies on the impact of fiscal deficits on economic growth shows that there a lack of thorough empirical investigation on this specific issue; for, most of these studies have only considered the impact of fiscal deficits per se on economic growth. Yet, the theoretical literature (as discussed later in Chapter Three) suggests that the impact of fiscal deficits on growth depends on other factors such as the level of fiscal deficits (as a percentage of GDP or GNP), the ways in which fiscal deficits are financed, and what deficit financing is used for in an economy. This study also contributes to the literature on the specific issue of deficit-economic growth connection by considering all these factors.

Our study is unique in the following ways. First, as argued above, while most of the existing empirical studies on the impact of fiscal deficits on growth have only considered the impact of fiscal deficits per se on economic growth, our study goes further than this and considers other factors which theory suggests may be important in determining the impact of fiscal deficits on economic growth. These

[3] These studies have empirically examined the effects of fiscal deficits on interest rates, inflation, savings, investment, and employment or output/national income growth.

factors include the size of fiscal deficits as a ratio of GDP, how the deficit is financed and what deficit financing is used for.

Second, following recent developments in econometric methodology, we employ a Generalised Method of moments (GMM) in estimating the impact of fiscal deficits on economic growth. This estimation technique produces more reliable coefficient estimates for dynamic models like ours and controls for the potential endogeneity problem associated with growth model estimation. These issues can be difficult to deal with when using ordinary least square (OLS) technique and other estimation techniques which have been employed in earlier studies. Finally, several existing studies on the impact of fiscal deficits on economic growth in developing countries - such as Nelson and Singh (1994) and Adam and Bevan (2005) - provide results and draw conclusions based on large sets of countries from different regions of the developing world. Economic characteristics of countries from different regions of the developing world are, however, different and hence may make the results and policy conclusions based on the analysis of data pooled in this way potentially misleading. We take account of this issue in our study and check whether there are any significant regional differences in the sample of developing countries considered in this study before we discuss our results and draw any conclusions.

1.3 Research Objectives

The objectives of this study are three-fold:

(1) To empirically examine the impact of fiscal deficits on economic growth in developing countries;

(2) To examine whether there are any significant regional differences in terms of the relationship between fiscal deficits and economic growth in developing countries; and

(3) To discuss the policy implications of the findings in relation to the first two research objectives.

1.4 Research Hypotheses

Based on deduction from the existing theoretical and empirical literature on the relationship between fiscal deficits and economic growth (see discussion in Chapter Three), this study tests the following four research hypotheses:

(1) Fiscal deficits have a significant positive or negative impact on economic growth in developing countries;

(2) The impact of fiscal deficits on economic growth depends on the size of deficits as a percentage of GDP – that is, there is a non-linear relationship between fiscal deficits and economic growth;

(3) The impact of fiscal deficits on economic growth depends on the ways in which deficits are financed; and

(4) The impact of fiscal deficits on economic growth depends on what deficit financing is used for.

1.5 Methodology

There are two main approaches to social science research; *deductive approach* and *inductive approach*. The deductive approach to research begins from a more general theory about the topic of interest to a more specific hypothesis. The hypothesis is then tested using observations or data analysis in order to confirm or falsify the original theory. On the other hand, the inductive approach starts with specific observations or data analysis and ends up with developing a general conclusion or theory (May, 2001; Robson, 2002; Blaikie, 2003; Bryman, 2004; Saunders and Lewis, 2012). Our study follows the former approach; based on the deductions from relevant literature on fiscal deficits and economic growth, we establish some key research hypotheses on the relationship between deficits and growth. We then formulate the theoretical and empirical model on the relationship between fiscal deficits and economic growth. Finally, we estimate this model to test the established hypotheses on the relationship between fiscal deficits and economic growth in developing countries. However, it should be noted that our study's aim is not to falsify the economic theory on the deficit-economic growth connection in the context of developing countries we consider in this study. We will confirm the theory if the results support or confirm it. However, if the results are not in favour of the theory then, instead of falsifying it, we will examine the possible causes of these results and their implications in terms of economic policy.[4]

The study can also be classified as quantitative in nature; for, it seeks to estimate empirically the impact of fiscal deficits on economic growth. On this basis, the study uses quantitative data on economic growth, fiscal deficits and other control variables considered in our empirical model. As far as data collection is concerned, the IMF's Government Finance Statistics and the World Bank's World Development Indicators served as the main sources of data.

In terms of data analysis, the study employs econometric analysis of panel data to estimate the relationship between fiscal deficits and economic growth. The choice of panel data study was mainly influenced by a number of important advantages this type of study has over the conventional time-series or cross-sectional studies. First, the use of panel data normally allows a researcher to get a larger number of data points (larger data set), more informative data and degrees of freedom as compared to time-series or cross-sectional data sets. This is especially important in a study like ours, given the problem of data availability on a number of variables

[4] *See Appendix A for the detailed discussion of the philosophical approach of our study.*

considered in our empirical model. As is well documented in the literature, data for many economic variables, especially fiscal variables, are not consistently available for many developing countries, thus making it difficult to get a reasonably large and good time-series or cross-sectional data set to use in the empirical part of the study. Using panel data, however, can help to minimise this problem. Second, while time-series and cross-sectional studies are likely to suffer from the omitted variable bias problem, using panel data analysis can help to control for this. Third, the panel data approach gives more variability and less collinearity among the explanatory variables – hence providing more efficient econometric estimates. Finally, the use of the panel data framework allows one to control for the likely endogeneity of one or more explanatory variables, and measurement errors by using lags of the regressors as instruments where needed (Judson and Owen, 1996; Hsiao, 1986, 2003; Bond *et al.*, 2001; Wansbeek, 2001; Baltagi, 2008 - among others).

It is worth noting, however, that a number of econometric issues may arise when a panel data framework is used in economic growth studies like ours. For instance, there may be two-way causality between some of the explanatory variables and economic growth (independent variable). In addition, there may be some outlying observations resulting from the differences in economic characteristics and performances of countries included in the panel. Furthermore, for a dynamic growth model like the one we are estimating in this study, the unobserved country-specific factors will be most likely correlated with the lagged dependent variable (Hsiao, 1986, 2003; Kiviet, 1995; Bond *et al.*, 2001; Arellano and Bond, 1991; Baldacci, 2003; among others). To control for these problems, we estimate our model using the Arellano and Bond (1991) generalised method of moments (GMM) estimation technique. As Arellano and Bond (1991) and other studies have demonstrated, this estimation technique controls for all these issues and produces more consistent and efficient econometric results than other estimators – such as ordinary least square (OLS), fixed effect (FE) and random effect (RE) estimation techniques.

The detailed methodological framework followed in undertaking this study is discussed later in Chapter Four.

1.6 Thesis structure

This thesis is organised into eight chapters. Following this introductory chapter, Chapter Two presents some key issues related to fiscal deficits. It includes definitions and measurements of fiscal deficits, discussion of the alternative ways of deficit financing, and discussion of the general macroeconomic effects of fiscal deficits. Chapter Three presents a critical review of the existing literature on the impact of fiscal deficits on economic growth. This includes both the theoretical and empirical literature. Chapter Four discusses the methodological framework used in carrying out this study. It presents discussion of the theoretical model employed in carrying out the study - based on which the empirical model used to estimate the impact of fiscal deficits on economics growth is built, outlines the empirical model and estimation strategy used in the study, discusses data and data sources, and discusses the econometric methods used in data analysis. Chapter Five presents a descriptive analysis of data on the major variables included in our empirical model. In doing this, the chapter presents the analysis of the trends in fiscal deficits, economic growth and other control variables. It also examines whether there exist any significant differences in the trends of these variables between different regions of the developing world considered in our study. Chapter Six presents the econometric analysis of the impact of fiscal deficits on economic growth in developing countries using data from a sample of thirty-one countries. Chapter Seven discusses the policy implications of our empirical results on the impact of fiscal deficits and other policy variables on economic growth in developing countries. Finally, Chapter Eight presents a summary and conclusions of the study.

Chapter Two

FISCAL DEFICITS: DEFINITION, MEASURES AND THEIR EFFECTS ON THE MACROECONOMY

2.1 Introduction

Public finance literature shows that there are a number of different definitions and measures of fiscal deficit. The existence of alternative definitions and measures of the fiscal deficit raises the question as to which is the appropriate measure of the fiscal deficit in assessing fiscal stance, sustainability and the effects of fiscal deficits (or fiscal policy in general) on the macroeconomy. Various studies (such as Easterly *et al.*, 1994; Jacobs *et al.*, 2002; Jacobs, 2002; among others) show that the choice between the alternative definitions and measures of the deficit depends mainly on the purpose it is intended for (or in other words, the type of analysis one wants to undertake in a particular study). It follows, therefore, that it is important that the differences between the alternative definitions and measures of deficit, together with their analytical and policy-motivated foundations, are well understood before one chooses a particular measure of the fiscal deficit to use in the assessment of the impact of fiscal deficits on economic performance. On this basis, therefore, this chapter is devoted to the discussion of the alternative definitions and measures of fiscal deficits and the ways fiscal deficits are financed, before we proceed with the analysis of the impact of fiscal deficits on economic growth in developing countries (which is the main focus of this study) in the subsequent chapters. The chapter also discusses briefly the available alternative ways of covering fiscal deficits and presents an overview of the likely effects of fiscal deficits on the macroeconomic performance.

The chapter is organised as follows. Following this introductory section, section 2.2 presents some definitions of the fiscal deficit. Section 2.3 discusses the alternative ways of financing fiscal deficits. Section 2.4 discusses the alternative measures of fiscal deficits. Section 2.5 presents an overview of the effects of fiscal deficits on the macroeconomy. Finally, section 2.6 concludes.

2.2 Definition of Fiscal Deficit

Public finance literature shows that there are numerous definitions of fiscal deficit, depending on how the deficit is measured. However, the widely accepted definition, and the one we will use in this study, is that fiscal deficit is the excess of government expenditure over government revenue receipts taken in from taxes, fees and charges levied by government authorities (Hyman, 1996). A fiscal deficit generally suggests an expansionary fiscal stance. Contrary to this is the fiscal or budget surplus, which may be an indication of contractionary fiscal stance.

Fiscal deficit can be measured on a cash basis or an accrual basis. In the first case, the deficit measures the excess of total government cash outlays over total government cash revenues. On the other hand, in the second case, the deficit measures the excess of accrued spending over income (Agenor and Montiel, 1999; Jacobs *et al.,* 2002).

According to public finance literature and practices by governments and institutions such as the World Bank and the International Monetary Fund, fiscal deficits (or fiscal balance in general) have been commonly reported for three different scopes (sizes or coverage) of government worldwide. These are: (i) budgetary central government; (ii) consolidated central government; and, (iii) consolidated general government (Blejer and Cheasty, 1991; Buiter, 1997; Legeida, 2000; Agenor, 2004; and, IMF – various issues).

Budgetary central government fiscal balance (deficit/surplus) is the narrowest measure of fiscal stance as far as the coverage of the public sector is concerned. This includes the deficit of the "central government" component of government only; i.e., budgetary central government deficit equals the difference between budgetary central government revenues and expenditures. This is expressed as follows:

Budgetary central government budget balance = budgetary central government revenue – budgetary central government expenditures

Where**,** central government includes all units representing the territorial jurisdiction of the central authority throughout a country (IMF, various issues).

Consolidated central government fiscal balance (deficit/surplus) includes deficits for budgetary central government, social security funds and extra-budgetary funds/accounts[5]. According to the IMF manuals on Government Finance Statistics (various issues), the consolidated central government budget balance equals the following fiscal stance:

Consolidated central government budget balance = central government budget balance + social security funds balance + extra-budgetary accounts balance

Finally, the consolidated general government fiscal balance (deficit/surplus) includes the total of deficits for central, state and local governments, and for any supranational authorities operating in a country, excluding all identifiable transactions between different levels of government. This can be expressed as follows:

Consolidated general government budget balance = central government budget balance + total state governments budget balance + total local governments budget balance + total budget balance (deficit/surplus) of supranational authorities – identifiable transactions between different levels of government

Where, *central government* is as defined above. *State (or provincial, or regional) governments* are defined as governments that exercise authority independent of central government in specific sections of a country's territory (encompassing a number of smaller localities). *Local governments* consist of government units that exercise an independent authority in the various urban and/or rural jurisdictions of

[5] Note, extra-budgetary funds are funds associated with institutions or units outside the budget that raise money through the imposition of tax or compulsory levies, or are created with some charitable purpose, and which deals with provision of non-marketable goods or services (IMF Manuals of GFS, various issues; Legeida, 2000)

a country's territory. S*upranational authorities* consist of the international governmental organisations (also known as intergovernmental organisations), other than their headquarters units, operating in a country.

Critical analysis of the above-discussed scopes of budget stance measures shows that the consolidated measures of fiscal stance (consolidated general government or consolidated central government) represent the most accurate measures of the fiscal position of the country, and as such these measures should be used (whenever available) in assessing fiscal sustainability and the economic effects of fiscal deficits or surplus. This is because the unconsolidated measures of fiscal stance do not encompass the fiscal content of institutions such as public enterprises, the central bank, and the public financial institutions, which in practice carry out government-like transactions that can be relevant when measuring the impact of fiscal deficit. On this basis, therefore, our study use only the consolidated general government measure of fiscal variables in the empirical analysis part.

2.3 Means of Financing Fiscal Deficits

When government spending exceeds revenues, the resulting budget deficit must be financed in one way or another in order for the government to meet its financial obligations. Following Sachs and Larrain, 1993; Weiss, 1995; and Agenor, 2004, various ways of financing government budget deficit can be explained using the government budget constraint. This is as expressed in equation 2.1 below:

$$DFCT = D_t^g - D_{t-1}^g = P \cdot (G - R) + i \cdot D_{t-1}^g \text{ .... (2.1)}$$

Where; $DFCT$ is government fiscal deficit, $D_t^g - D_{t-1}^g$ is the change in government debt between the current and previous period, P is the price level, G is total government expenditure, R is total revenue receipts (raised from taxes, fees and charges levied by government authorities) and $i.D_{t-1}^g$ is interest payments on previously issued government debt.

Government debt can be held by the central bank and by the public (domestic or foreign). Assuming, for simplicity, that lending by the central bank to the banking sector does not change over time, then the change in monetary base $(m_t - m_{t-1})$ will be equal to the change in the stock of government debt held by the central bank $(D_{c(t)}^g - D_{c(t-1)}^g)$ plus the change in foreign exchange reserves $E \cdot (B_{c(t)}^* - B_{c(t-1)}^*)$ - where E stands for the nominal exchange rate and $B_{c(t)}^* - B_{c(t-1)}^*$ is the change in the foreign reserves held by the central bank between the current and previous period.

From the above, we get the following:

$$DFCT = (D_t^g - D_{t-1}^g) = (m_t - m_{t-1}) + (D_{p(t)}^g - D_{p(t-1)}^g) - E \cdot (B_{c(t)}^* - B_{c(t-1)}^*) \text{ .... (2.2)}$$

Where; $D^g_{p(t)} - D^g_{p(t-1)}$ is government debt (both domestic and foreign) held by the public, and others are as defined above.

Equation 2.2 implies in essence that there are four ways of financing a government budget deficit (Sachs and Larrain, 1993; Tarp, 1993; Weiss, 1995; Agenor, 2004):

(1) borrowing from the central bank (also known as monetization of the deficit)

(2) increasing the level of domestic debt

(3) increasing the level of foreign debt

(4) running down foreign exchange reserves

Bringing all these ways of financing fiscal deficit together, we obtain:

Fiscal Deficit = (Borrowing from the central bank + Domestic Borrowing + External Borrowing + Foreign Reserve Use)

These ways of financing fiscal deficits have been discussed in details by (Fischer and Easterly, 1990; Tarp, 1993; Weiss, 1995; Piontkivsky *et al*., 2001; among others). Borrowing from the central bank occurs when the central bank finances the budget deficit by directly lending the funds needed by the government to meet its expenditures or indirectly by purchasing government debt at the time of its issuance or later through open market operations (Weiss, 1995; Piontkivsky *et al*., 2001). Domestic borrowing can be exercised voluntarily or on a compulsory basis. In the economies where capital markets are well developed, it can be possible for governments to finance the deficit by issuing bonds that are voluntarily purchased by the private sector. Elsewhere, different forms of compulsory purchase of government debt can be used: these include setting reserve requirements for financial institutions operating in the domestic economy, introduction of compulsory purchase of government bonds by commercial banks, and accumulation of arrears of government payments on debts to the private sector (Fischer and Easterly, 1990; Weiss, 1995). Foreign borrowing involves increase in the government's holding of foreign debt. As noted in Weiss (1995), this means of deficit financing is, however, only useful in economies that are creditworthy. Finally, financing of a fiscal deficit by running down foreign exchange reserves usually occurs by the central bank first purchasing government debt on the primary or secondary market (or simply granting a loan to the government) thereby injecting additional reserves to the economy and then trading available foreign exchange reserves for domestic currency (Sargent and Wallace, 1981; Ouanes and Thakur, 1997; Piontkivsky *et al*., 2001).

2.4 Measures of Fiscal Deficits

Economic literature shows that various measures of fiscal deficits have been used in assessing fiscal stance and the effects of fiscal deficits on economic performance. These measures can be grouped into the following two main categories (Blejer and Cheasty 1993; Jacobs, 2002; Jacobs *et al*., 2002):

- The conventional (also called accounting) measures of the fiscal deficit. This is the measure of the fiscal deficit that governments normally report in their budgets; and,

- Refinements of the conventional measure of the fiscal deficit (also called special-purpose deficit measures). These are special-purpose deficit measures that attempt to isolate from the conventional deficit the components that are relevant for assessment of specific fiscal stance or impact of various budgetary transactions.

These measures of the fiscal deficit are discussed in more detail below.

2.4.1 Conventional Measures of the Fiscal Deficit

The conventional measure of the fiscal deficit generally measures the amount of resources utilised by the government in a given fiscal period, usually a year, that need to be financed after total revenue has been deducted from total expenditure (Blejer and Cheasty, 1991, 1993; Jacobs *et al*., 2002; among others). It is thus defined as the difference between total budgetary expenditures and total budgetary revenues of the government that needs to be covered by some forms of deficit financing. According to Jacobs (2002, pp. 5-6), citing Tanzi *et al*. (1988), the conventional measure of the budget deficit (or the budget balance in general) was originally developed in an attempt to provide, among other things, a measure of the government's contribution to aggregate demand in the economy and the lack of equilibrium in the current account of the balance of payments, or to measure the crowding-out of the private sector.

According to the IMF's Manuals on Government Finance Statistics (various issues), the conventional budget balance (deficit/surplus) is measured as follows:

Conventional Fiscal Balance = ((Government expenditure + Net lending) - (Government's total revenue receipts))

Where; *Net lending* equals lending minus repayments, and government's revenue receipts include both tax and non-tax revenue receipts.

Analysis shows that governments worldwide usually report their deficits using the above IMF measure of conventional fiscal deficits. However, the economic literature shows that several variants of the conventional measure of the deficit exist. According to Blejer and Cheasty (1991, p.1646), there are two main areas/causes of variance:

- the distinction between the budgetary items that determine the fiscal deficit (revenues and expenditures) on the one hand and the items that finance it on the other, and

- specification of the time period at which the resource use is measured (cash deficit or accrual deficit)

(1) The distinction between the items that determine the deficit (revenues and expenditures) and the items that finance it

There are two main criteria used to distinguish between the items that determine the deficit (revenue and expenditure) and the items that finance it: the *government debt criterion* and the *public sector policy criterion*. In the first case, transactions are considered as deficit-determining, and are therefore classified as either revenue or expenditure, when they do not create or change a liability for the government, and those that change the level of government liability are considered as deficit financing. In the second case, transactions are considered deficit-determining, and are therefore classified as either revenue or expenditure, instead of deficit financing, when they are used to pursue policy goals rather than being part of public sector liquidity management (Blejer and Cheasty, 1991, pp. 1646-1649).

These two criteria for distinguishing between the items that determine the deficit (revenue and expenditure) and the items that finance it can lead to significant discrepancies in the sizes of the conventional deficit reported using the two criteria. According to Blejer and Cheasty (1991, p.1647), at least three types of transactions can cause discrepancies in the two criteria: budgetary net lending; external grants; and, debt service.

- *Budgetary net lending* - Unlike other government expenditures, government lending to the private sector may involve liability management, and for this reason, under the government debt criterion, should be classified as deficit-financing type of transactions. However, it is also possible that a significant proportion of government lending to the private sector may be composed by the mix of direct capital infusion and of government credit programmes undertaken in order to pursue certain policies goals (for example, to supply credit to some selected sectors of the economy). Given the subsidy element of this transaction and the possibility that part of the government lending to the private sector may not be paid back, "net lending" cannot be defined as pure deficit financing, and the public policy criterion would then classify it as part of government expenditure - and hence classified as deficit-determining.

- *External grant* - External grants represent, in essence, government financing without any liability. It follows therefore that grants will be treated as one of the components of government revenue, and therefore a deficit-determining transaction, in the government debt criterion. However, under the public policy criterion, grant aid would be included in the other forms of foreign financing, and thus classified as deficit financing.

- *Debt service* - In some countries, levels of public debt may already be too high and unsustainable to the extent that amortised debt may not be easily and voluntarily re-invested in new government bonds. In such a situation, replacement financing for amortisation could require a policy effort by the government similar to that of generating extra tax revenue. Hence, in this situation, in contrast to the government debt criterion, which considers debt amortisation as deficit financing, the public policy criterion would consider debt amortisation as a deficit determining transaction.

Indeed, these divergences in classification of the above three transactions can lead to significant discrepancies in the size of conventional budget balance estimated using the *government debt criterion* and the *public policy criterion*. According to the IMF's Government Finance statistics (IMF's GFS) manuals of 1986 and 2001, IMF followed the former methodology in compiling and reporting data on fiscal policy variables until 2001 when it switched to the later methodology of compiling and reporting data (*Appendix C summarises these methodological differences between the 1986 GFS system and 2001 GFS system*). As discussed later in the methodology chapter, this study use fiscal data which were compiled in accordance to the government debt criterion (1986 GFS system).

(2) *Specification of the time at which the resource use is measured (Cash and accrued deficits)*

Another main source of variation between the conventional deficit measures is the specification of the time at which resource use is measured (that is, the choice between *cash* deficit and *accrual* deficit approaches). As discussed earlier, cash deficit captures the budget balance of only government expenditures for which cash has been disbursed and only actual cash revenues received during a specific single budget period. On the other hand, accrual deficit captures the actual net resource flows in government transactions – that is, it captures the consequences of government's fiscal policy decisions - during the budget period, regardless of whether or not transactions have actually been paid for (Blejer and Cheasty, 1991; Jacobs, 2002; Jacobs *et al*., 2002). This is another main area of differences between the IMF's GFS data compiled and reported in accordance to the 1986 GFS system (the data we have used in this study) in which *cash basis* is used in constructing fiscal variables, and the data compiled and reported in accordance to the 2001 GFS system in which countries are encouraged to report fiscal data on *accrual basis*.[6]

Such differences in specification of the time at which resource use is measured result in significant differences between the size of the fiscal deficit calculated on a cash and accrual basis. In practice, however, it is difficult to follow either the purely cash or purely accrual approach, and countries usually report deficits which lie somewhere between the complete cash and complete accrual deficit measures. As noted in Blejer and Cheasty (1991, pp. 1649-1650), for instance, even for countries which have opted for a Public Sector Borrowing Requirement (i.e., cash deficit), interest payments are usually measured as they accrue, rather than when they are actually paid. On the other hand, government revenues are usually reported on cash or quasi-cash basis. Hence, in the light of such problems associated with the measurement of the conventional deficit on purely cash or accrual basis, the cash and accrual accounting approaches have been reconciled on the basis of arrears that led to the measurement of the deficit on a commitment basis. This practice has resulted in the following measurement of conventional fiscal deficit/balance (Legeida, 2000):

[6]See Appendix C for more details on these methodological differences between the 1986 GFS system and 2001 GFS system.

Fiscal Deficit on commitment basis = Revenue receipts – Non-interest government expenditures – Scheduled interest payment = Commitment budget deficit = (-) Deficit financing = New external borrowing – Scheduled external debt amortisation + Change in arrears + Net domestic borrowing

To sum up on the conventional measure of the budget deficit, this is generally regarded as the financing gap during a fiscal year after the government's total revenue (including tax and non-tax revenue) has been deducted from total government expenditure. Analysis shows that this is the main measure of the fiscal deficit that governments worldwide usually report in their budgets. In addition, analysis of the literature shows that, given its easy and wide availability, the conventional measure of the fiscal deficit has been the most widely used measure of the deficit in the studies on fiscal sustainability and the effects of fiscal deficits on economic performance (Blejer and Cheasty, 1991; Jacobs *et al*., 2002).

2.4.2 Special – Purpose Deficit Measures

As pointed out earlier, there exist some special-purpose measures of the fiscal deficit other than the conventional measure. According to the literature, these measures have been developed by economists and policymakers in an attempt to isolate from the conventional deficit measure the magnitudes that are more relevant for assessment of specific fiscal stance or economic impact of various budgetary transactions. Some of the main types of special-purpose deficit measures that have been widely calculated include: i) primary deficit; ii) current deficit; iii) domestic and foreign deficits; iv) deficit that measures the contribution of different elements of government transactions to aggregate demand; v) operational deficit; and vi) full-employment and cyclically adjusted deficits (Blejer and Cheasty, 1991, 1993; Weiss, 1995; Legeida, 2000; Jacobs, 2002; Jacobs *et al*., 2002). These measures should not be looked at as either good or bad, as each of the measure reveals only a specific aspect of the government fiscal stance and can be useful depending on the purpose they are intended for. Hence, understanding what all these measures reveal, together with their analytical and economic rationale, can be useful.

i. The primary deficit

The conventional deficit measures the difference between government outlays and income, where outlays include interest payments on the stock of public debt. This measure, therefore, is influenced by the size of previous deficits. In order to remove the effects of the previous deficits on the budget, economists calculate the *primary deficit* (also called *"non-interest deficit*") by omitting interest payments from the budget. Thus, the primary deficit equals the following fiscal stance:

Primary deficit = Conventional deficit – Interest payments

The primary deficit, therefore, measures the impact of the discretionary government budget (Barth *et al*., 1989). It seems that the main economic rationale for estimating the primary deficit is to remove the interest payments (which are the result of past decisions) from the budget in order to get a more accurate picture of the government's current fiscal policy. In that way, one of the uses of the primary deficit could be the assessment of the success or failure of the government's current policies in moving the economy towards a sustainable funding path.

ii. The current deficit

Unlike the conventional deficit measures, which include both current and capital transactions in their calculations, the current deficit measure considers only the difference between current revenues and expenditures. This gives the following fiscal stance:

Current fiscal balance = Total current revenues – Total current expenditures

The current deficit can be useful to economists and policymakers in assessment of whether the government can finance its consumption expenditures from its revenues (IMF, 1995). Moreover, it can be argued that, if separate and conceptually correct current and capital accounts were maintained, the deficit on current account would be the "true deficit". This is because, unlike the current account, for the capital account, any excess of outlays over revenues does not cause any changes to the net asset position of the government as the new debt is matched by a new government asset (Boskin, 1982).

iii. The domestic and foreign Deficits

Some economists have argued that the conventional measure of the deficit can be somewhat misleading when the public sector has sizeable trade or capital flows to and from the rest of the world. As noted in Blejer and Cheasty (1991, pp. 1652-1653), for instance, expenditure on domestic goods that is fully financed by external grants increases aggregate demand without any offsetting withdrawals. In addition, government imports financed by domestic taxes reduce aggregate demand by the full amount of the import bill – a scenario where government expenditure may have contractionary rather than expansionary effects. It follows, therefore, that the overall deficit could well be zero in each of the above two examples, though each implies an opposite domestic impact. To isolate the effects of the government and the external sector on aggregate demand in an open economy, therefore, the domestic deficit and the foreign (or external) deficit have been calculated separately by economists.

The domestic deficit (or, domestic budget balance in general) is measured by including in the calculation only those budgetary transactions taking place within the domestic economy and excluding those that directly influence the balance of payments. This equals the following fiscal stance:

Domestic balance = Conventional deficit – external balance

On the other hand, the foreign deficit (or "foreign/external budget balance" in general) is measured by including in the calculations only those budgetary transactions that are directly connected with the foreign sector.

iv. *Deficit that measures the contribution of different elements of government transactions on aggregate demand*

It is argued that different elements of government transactions (expenditures and revenues) generate different net increases to, and withdrawals from, aggregate demand. As a result, economists have sometimes attempted to isolate in the fiscal deficit measure the contribution by the government to aggregate demand (Blejer and Cheasty, 1991). The most commonly used deficit measures of the contribution of different government transactions to aggregate demand separates the exhaustive expenditure (spending on goods and services) from spending on transfers. In this case, for example, the deficit measure that considers only the exhaustive expenditure is measured as:

Budget balance = conventional fiscal deficit - government spending on transfers

The main economic rationale of estimating deficit measures that separate exhaustive expenditures and transfers is that the impact of these two categories of government expenditure on aggregate demand will be different. For instance, tax-financed transfers such as pension and unemployment benefits merely redistribute resources from one part of the private sector to another in the economy. In addition, in terms of their impact on aggregate demand, tax-financed transfers are similar to negative taxes rather than to government's expenditure on goods and services. Analysis also shows that the inclusion of transfers in government spending may at times overestimate the government's contribution to aggregate demand due to the time lags in the actual spending of transfers. As noted in Blejer and Cheasty (1991, p.1652), this problem may especially occur in economies where there are different levels of government. In this case, for example, a transfer from one level of the government to another – say, from the central government to the local government level, may not increase aggregate demand until the year or years after it was recorded in the budget of the central government. Clearly, including such a transfer in the current year's government spending will overestimate the government's contribution to aggregate demand.

v. The operational deficit

Fluctuations in inflation can significantly change the size of the government budget deficit, and when this happens, the conventional measure of the budget deficit may not give a true picture of the impact of government activity on aggregate demand (Weiss, 1995). According to economic theory, fluctuation in inflation affects the government budget in many ways. For instance, it causes distortionary effects on real revenues collected by the government. In addition, inflation affects the real value of government assets and liabilities (Tanzi, 1977; Blejer and Cheasty, 1991). One important implication of these effects of inflation on the government budget is that inflation may reduce the real value of the outstanding public sector debt, while at the same time compensating holders of the government debt for such a reduction in their real assets through higher nominal interest rates. This implies that some of the government's interest payments on its debt will in reality be part of the amortisation of that government debt in an inflationary situation. It follows therefore that, if the inflationary component of interest payments is not removed from the interest bill, the size of the government budget deficit will be over-stated by the size of the amortisation component included in the total outstanding government debt (Blejer and Cheasty, 1991, p. 1655-1656; Weiss, 1995, p. 34).

To remove the inflation-induced component of interest payments from the fiscal deficit calculation, economists have suggested the use of the operational deficit. This is simply measured as follows:

Operational deficit = primary deficit + real interest payments

According to Blejer and Cheasty (1991) and Weiss (1995), the main economic rationale in the calculation of the operational deficit is to remove the inflation component of interest payments from the deficit on the basis that this is simply similar to amortisation payments, which do not represent any new income to recipients and the economy in general.

vi. The full-employment and cyclically adjusted deficits

Economists have also attempted to calculate deficit measures that remove the effects of fluctuations in economic activity on the budget (Agenor, 2004). There are two main types of these measures: *the high or full-employment deficit* (also known as *high-employment deficit* or *structural deficit*) and the *cyclically adjusted deficit* (also known as *trend deficit*). These deficit measures have been surveyed in Blinder and Solow (1974), De Leeuw and Holloway (1982, 1983, 1985), and Heller *et al*. (1986).

The full-employment deficit measures the deficit at some arbitrarily defined full employment or potential output level of economic activity (De Leeuw and Holloway, 1982; Dornbusch *et al*., 2001). This measure was developed by economists in the belief that "a small surplus in the full employment budget would ensure a high level of national saving while permitting built-in fiscal stabilizers to damp cyclical fluctuations" (Blejer and Cheasty, 1991, pp. 1653-1654, citing De Leeuw and Holloway, 1983, p. 27).

The full-employment deficit measure, however, suffers from the limitation that using it could result in the expansion of the public debt since, on average, economies usually operate below full-employment level, so that, on average, government expenditure would exceed government revenue. To address this limitation of the high-employment deficit measure, economists developed the cyclically adjusted deficit (or trend deficit) to provide a budget balance rule that would maintain a constant level of public liabilities in budget preparations (Blejer and Cheasty, 1991).

Calculation of the cyclically adjusted budget balance (deficit or surplus) involves the following steps (De Leeuw and Holloway, 1985, p.232; Blejer and Cheasty, 1991, p.1654):

1) Choosing a reference trend for GDP/GNP that is free from short-run fluctuations,

2) Determining the responsiveness of government transactions (expenditures and revenues) to short-run fluctuations in GDP/GNP,

3) Applying the responsiveness of expenditures and revenues to any gaps between trend GDP/GNP and actual GDP/GNP, and

4) Finally, adding the expenditures and receipts "gross-ups" obtained in step 3 to the actual budget to obtain a cyclically adjusted budget balance.

A comparison between the cyclically adjusted deficit and the full employment deficit shows that they both measure the budget deficit that would occur if the economy were at full employment. However, these measures differ on the GDP or GNP reference trends that are used in their calculation: a cyclically adjusted deficit is constructed using a GDP or GNP that is free from short-run fluctuations as the reference trend, while a full employment deficit is constructed using potential output as the GDP or GNP reference trend.

Analysis shows that these special-purpose deficit measures can be very useful, some even more useful than the conventional measure of the deficit, for analysing fiscal stance (Agenor, 2004) and the effects of fiscal deficits on other macroeconomic variables (such as aggregate demand, inflation, balance of payments, economic growth, etc.). However, the problem is that most of these are difficult to calculate, and for this reason not easily available, especially for the case of developing countries. In fact, most governments worldwide only report the conventional budget balance (deficit or surplus) in their budgets. This has made this measure the more widely used measure of the fiscal deficit in assessment of fiscal stance, sustainability and the effects of fiscal deficits on economic performance.

2.5 Effect of Fiscal Deficits on the Macroeconomy – An Overview

The relationship between fiscal deficits and other macroeconomic variables represents one of the most widely debated issues in economics.[7] Since the Keynesian revolution in macroeconomics, many economists and policymakers (the so-called Keynesians) have argued that deficit spending could be used as one of the effective measures to achieve two of the stated national economic objectives: a high rate of economic growth and full employment. In particular, these economists and policymakers believe that deficit spending would be required to promote economic growth and fight unemployment during periods of recession, or when the economy is operating far below its full capacity. Keynesians believe that economies can benefit from deficit spending policy during economic recession because of the

[7] We briefly discuss this here because understanding of these macroeconomic relationships can help to explain some of the transmission mechanisms through which fiscal deficits affects economic growth.

reduction in lost output and employment and because this policy would help the economy to achieve a higher rate of growth. In their viewpoint, Keynesians see no need to balance the budget during periods of recession. Instead, they believe in the notion of a cyclically balanced budget that, on average, the budget should be in balance over the business cycle – in surplus during periods of boom and in deficit during periods of recession. The Keynesian view of deficit spending is generally based on the premise that the market economy left to itself will not always be able to sustain aggregate demand at a level consistent with full employment (Chrystal and Thornton, 1988; Bernheim, 1989; Fischer and Easterly, 1990).

However, the Keynesian analysis of the economic effects of fiscal deficits has been challenged increasingly over the years. A large number of economists (the so-called Neo-classical economists) now believe that deficit spending policy has little or no effect on employment and output - especially in the long run - and that it primarily leads to a transfer of resources, and therefore the re-distribution of output, from the private sector to the public sector (Chrystal and Thornton, 1988; Bernheim, 1989). In addition, support for this viewpoint has also shown a growing concern about the potentially negative effects on both the real and the financial sides of the economy of the ways in which the deficits are financed. Monetisation of the deficit can lead to inefficiencies in financial markets and cause inflation. Domestic borrowing may lead to an increase in real interest rates, and hence crowd-out the private sector. Excessive use of foreign borrowing can result in excessive foreign debt – hence making the country's access to international capital markets harder and increasing the probability of the government's default on its foreign debt obligations. Finally, the use of foreign reserves - especially when used excessively and for the long term - can lead to speculative pressure on the exchange rate, thereby causing exchange rate depreciation and capital flight, thus leading to balance of payments crises (Chrystal and Thornton, 1988; Fischer and Easterly, 1990; Weiss, 1995; Ouanes and Thakur, 1997; Shojai, 1999; Piontkivsky *et al*., 2001; Agenor, 2004). Indeed, all these macroeconomic problems can in turn lead to detrimental effects on economic growth.

In addition, the Keynesian view of fiscal deficits has also been challenged by the so-called Ricardian economists. According to the Ricardians, deficit spending is irrelevant in the determination of macroeconomic performance since public and private spending are perfect substitutes (Barro, 1974). In the Ricardians view, far-seeing consumers recognise that government debt generated through borrowing to finance fiscal deficits will eventually be paid-off by future tax increases, the present value of which is exactly equal to the present value of the reduction in taxes (Fischer and Easterly, 1990, p. 129). These consumers, who also care enough about their future prosperity and the prosperity of future generations, would therefore foresee this future tax increase when the government pursues deficit spending policy and adjust their present consumption accordingly. This means that consumers will not simply take a deficit-financed increase in government spending as a lucky windfall, but will save part of their proceeds in anticipation of the future tax burden. As a result, consumers will not raise their demand for goods and services, thus leaving aggregate demand, output, interest rates and prices stable. In this situation, therefore, the Ricardians see deficit spending policy as a matter of indifference with no real economic effects (Barro, 1974, 1989; Bernheim, 1989; Fischer and Easterly, 1990).

2.6 Conclusion

This chapter has discussed the meaning of the fiscal deficit and other related issues that need to be understood before any meaningful analysis of the impact of fiscal deficit on economic performance could be made. In terms of its meaning, fiscal deficit generally suggests an expansionary fiscal policy and reflects the financing gap resulting from government outlays exceeding revenue receipts - hence the definition of the fiscal deficit that we will operationise in this study. According to economic literature, and practices by governments and institutions such as the World Bank and the IMF, fiscal deficits are usually estimated for three different scopes of government: central government; consolidated central government; and, consolidated general government. However, analysis shows that, of these three scopes used in estimating public sector deficits, the deficit measures for the consolidated general or central governments would be the most appropriate measures of the fiscal position of the government; for, these represents the more accurate size of the public sector.

The Chapter has also discussed the ways in which the fiscal deficit can be financed. On this, we have seen that there are four main ways of financing the budget deficit - borrowing from the central bank (also called monetisation of the deficit), domestic borrowing, external borrowing, and running down the foreign exchange reserves.

Borrowing from the central bank occurs when the central bank finances the budget deficit by directly lending the funds needed by the government to meet its expenditures or indirectly by purchasing government debt at the time of its issuance or later through open market operations. Domestic borrowing can be exercised voluntarily when the government issues bonds that are voluntarily purchased by the private sector or on a compulsory basis when some forms of compulsory purchase of the government debt (such as setting the reserve requirements for financial institutions operating in the domestic economy, introduction of compulsory purchase of government bonds by commercial banks, and accumulation of arrears of government payments on debts to the private sector) by the private sector are used. Foreign borrowing involves increase in the government's holding of foreign debt. Finally, running down foreign exchange reserves usually involves the central bank first purchasing the government debt on the primary or secondary market (or simply granting a loan to the government) thereby injecting additional reserves to the economy and then trading available foreign exchange reserves for domestic currency.

In addition, the discussion in this chapter has looked at the different measures of the fiscal deficit. These can be grouped into two main categories, namely the variants of the conventional measure of the fiscal deficit and the refinements of the conventional measures of the deficit. The first category simply measures the difference between total government outlays and revenue receipts during a given fiscal period, usually a year. On the other hand, the second category includes the special-purpose deficit measures that attempt to isolate from the conventional deficits the magnitudes that are more relevant for assessment of a specific fiscal stance or the impact of various budgetary transactions. The main types of special-purpose deficit measures include the primary deficit, the current deficit, the domestic and foreign deficits, deficit that measures the contribution of different elements of government transactions on aggregate demand, the operational deficit, and the full-employment and cyclically adjusted deficits.

Finally, the chapter has presented an overview of the effects of fiscal deficits on macroeconomic performance. We have seen that the effects of fiscal deficits on the economy are not precisely known, and this is reflected by the ongoing debate on this issue. Some economists, the so-called Keynesians, point out the positive effects of deficit spending policy in terms its role in promoting economic growth and employment. Others, the so-called Neo-classical economists, argue that deficit spending has little or no effect on employment and output, and that it primarily results in a re-distribution of resources and output from the private sector to the public sector. These economists also point out the potentially negative effects of the means of covering the fiscal deficits that monetisation of the deficit can be inflationary, domestic borrowing can cause the crowding-out of the private sector, foreign borrowing can result in foreign debt crises, and running-down the foreign exchange reserve can cause capital flight and balance of payments problems. Then again, other economists, the so-called Ricardians, believe that fiscal deficits have no real impact on other macroeconomic variables and are therefore irrelevant in the determination of economic performance.

Having discussed these important issues related to fiscal deficits, the next chapter turns to the review of theoretical and empirical literature that particularly focuses on the impact of fiscal deficits on economic growth – which is the main topic of our interest in this study.

Chapter Three

THE IMPACT OF FISCAL DEFICITS ON ECONOMIC GROWTH: A CRITICAL REVIEW OF LITERATURE

3.1 Introduction

We have seen in the previous chapter that there are three main schools of thought concerning the impact of fiscal deficits on economic performance – Keynesian, Neo-classical and Ricardian. According to the literature, these schools of thought also offer three distinct theoretical perspectives on the specific issue of the deficit-growth connection. In the first perspective, Keynesians argue that deficit spending can have a significant positive impact on economic growth. According to Keynesians, deficit spending could be a useful economic policy tool in promoting economic growth during periods of recessions or when the economy is generally operating far below full-employment. In the Keynesians' view, such a policy can benefit societies during economic recession because of the reduction in lost output and employment and because this policy would help economies to achieve a higher rate of economic growth (Chrystal and Thornton, 1988; Bernheim, 1989; Fischer and Easterly, 1990). In the second perspective, Neo-classical economists believe that deficit spending policy has little or no impact on economic growth and that it primarily leads to crowding out of private investment and/or net exports. Neo-classical economists also warn of the potential macroeconomic imbalances (such as inflation, balance of payments problems and debt crises) caused by different ways of financing deficits and their consequences on economic growth (Chrystal and Thornton, 1988; Bernheim, 1989; Fischer and Easterly, 1990). Finally, in the third perspective, Ricardian economists believe that fiscal deficits have no impact on economic growth. In the Ricardian's view, fiscal deficits have no real economic effects - that is, deficits are irrelevant in the determination of macroeconomic performance, including economic growth (Barro, 1974, 1989; Bernheim, 1989; Fischer and Easterly, 1990).

It is interesting to note that one can find evidence in support of each of the above three theoretical positions on the impact of fiscal deficits on economic growth. Some empirical studies find that fiscal deficits have a positive and significant impact on economic growth. Some find that deficits have a negative and statistically significant impact on economic growth. Then again, other studies find that fiscal deficits have little or no impact on economic growth.

This chapter presents a critical review of the existing theoretical and empirical literature on the impact of fiscal deficits on economic growth. To do this, the chapter is structured as follows. After this introductory section, Section 3.2 examines the theoretical literature on the impact of fiscal deficits on economic growth. This looks at the main arguments put forward in each of the schools of thought on the impact of fiscal deficits on economic growth and their implications, and examines which of these schools of thought offers the most relevant insights on this issue. Section 3.3 reviews the existing empirical literature on the impact of fiscal deficits on economic growth. Section 3.4 discusses the potential policy implications of the impact of fiscal deficits on economic growth in the context of developing countries, and therefore on our study, of some of the key issues raised in the reviewed theoretical and empirical literature. Finally, Section 3.5 concludes.

3.2 Theoretical Literature

As pointed out earlier, literature shows that there are three distinct theoretical perspectives concerning the impact of fiscal deficits on economic growth – Keynesian, Neo-classical and Ricardian. The differences between these perspectives are mainly derived from the assumptions on which each perspective is based, which, in turn, have implications for the economic growth impact of fiscal deficits. These are discussed in the following sections.

3.2.1 The Keynesian Perspective

In the Keynesian perspective, a significant percentage of the population is thought to be either myopic or liquidity constrained and consumers are assumed to have very high marginal propensities to consume out of their current disposable incomes. This implies that aggregate consumption is very sensitive to changes in disposable income. In this situation, therefore, deficit spending (through increased government spending or tax reduction) has an immediate and significant impact on aggregate demand, and therefore national income. In addition, if the economy is initially operating in the short run and some economic resources are unemployed or underemployed, this increase in national income generates the second round effects of the well-known Keynesian multiplier, hence increasing the national income even further. It follows therefore that, in the Keynesian viewpoint, appropriately timed deficits (i.e., deficit spending when some economic resources are unemployed or underemployed) will have a significant positive impact on output and economic growth (Bernheim, 1989).

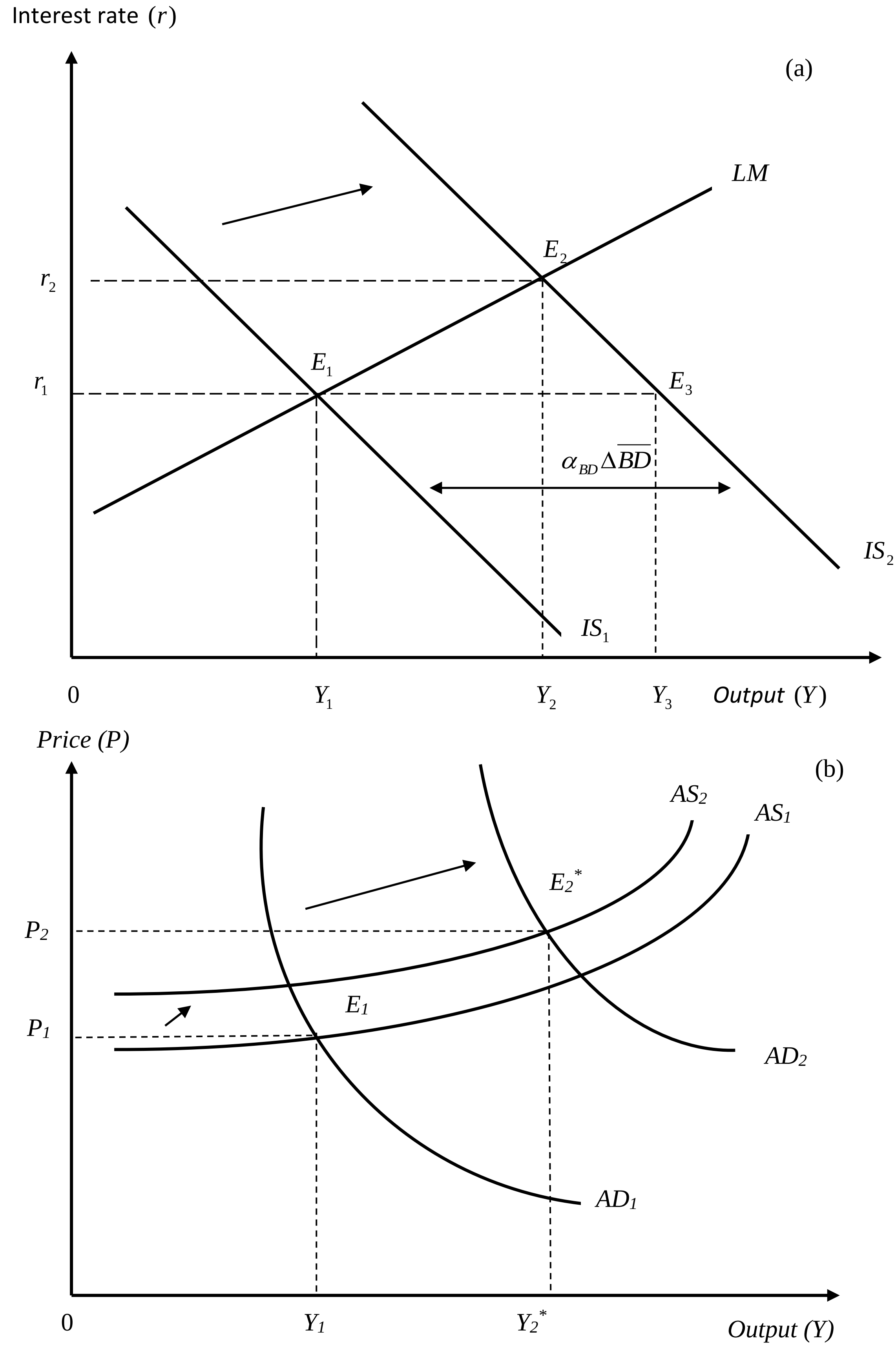
In the simplest Keynesian analysis of the impact of fiscal deficits on output, increasing the deficit by £1 would cause output to increase by the inverse of the marginal propensity to save (Bernheim, 1989). However, in the standard IS-LM analysis of monetary economies, one would expect that this increase in output caused by an increase in the deficit (expansionary fiscal policy) would raise the demand for money, which would in turn affect the money side of the economy and partially offset the Keynesian multiplier effect. To explain this further, if we assume that the money supply in the economy is fixed (that is, fiscal deficits are bond-financed), interest rates would rise as a result of an increase in the demand for money, thereby causing interest rate sensitive components of aggregate demand, particularly private investment and/or net exports to be crowded out to some extent. This crowding out would in turn partially offset the Keynesian multiplier effect of expansionary fiscal policy and therefore reduce the original increase in output.

There are two mechanisms through which the crowding out occurs under the Keynesian analysis. First, in a closed economy, a switch from tax to deficit finance (using bonds) raises domestic real interest rates and crowds out private investment. Second, in a small open economy with internationally mobile capital, net exports rather than domestic investment are crowded out. In this case, bond-financed deficits place upward pressure on domestic interest rates, thus leading to higher capital inflows and therefore an appreciation of the domestic currency. This in turn reduces net exports. Thus, in a small open economy, government deficits would most likely crowd out net exports rather than domestic investment. However, it should be noted that in a large open economy, both of the above mechanisms are likely to be operative (Yellen, 1989).

Regardless of the mechanism by which crowding out occurs, the Keynesian model allows for only a small measure of crowding out. This is because the increase in aggregate demand raises income, and with the rise in income, the level of saving rises. This expansion in saving, in turn, makes it possible to finance a larger budget deficit without adversely displacing private investment or affecting net exports.

The Keynesian mechanism on how bond-financed deficits influences output is illustrated in Figure 3.1 below.

Figure 3.1: The impact of bond-financed deficits on output



Sources: Porter and Ranney (1982), Dornbusch *et al*. (2001) and Mankiw (2007)

Figure 3.1(a) shows the impact of bond-financed deficit on output in the standard IS-LM model. From the initial starting equilibrium point in the economy, point E_1, deficit spending increases the level of aggregate demand, shifting the IS curve substantially from IS_1 to IS_2. At unchanged interest rates, the equilibrium income would rise by the full size of the multiplier (αBD) times the increase in budget deficit $(\Delta \overline{BD})$, thus moving the economy from equilibrium point E_1 to point E_3. This would imply a rise in output/income from Y_1 to Y_3. But, from the money demand effect discussed above, this increase in output/income will be followed by a rise in the demand for money. Since the money supply is fixed (given our assumption that the deficits are bond-financed), the interest rate rises from r_1 to r_2 where the money market comes back to equilibrium, thus causing a fall in interest sensitive components of aggregate demand - private investment and/or net exports - and partially offsetting the Keynesian multiplier effect. As a result, output falls back to level Y_2.

An increase in aggregate demand following deficit spending policy (or expansionary fiscal policy) is indicated by a rightward shift of aggregate demand (AD) curve from AD_1 to AD_2 at unchanged price level P_1 in Figure 3.1(b). However, note also that, as the figure shows, the aggregate supply (AS) curve will also shift leftward from AS_1 to AS_2 because the interest rate (r) has increased from r_1 to r_2. The net result is an increase in price from P_1 to P_2 *and* an increase in output from Y_1 to Y_2^*.[8]

[8] It is worth noting that, given the connection between IS-LM curves and the AD curve, the equilibrium level of output in part (a) cannot be different from that in part (b) in the case of the standard IS-LM and AS-AD models (Jha, 2003, p. 45).

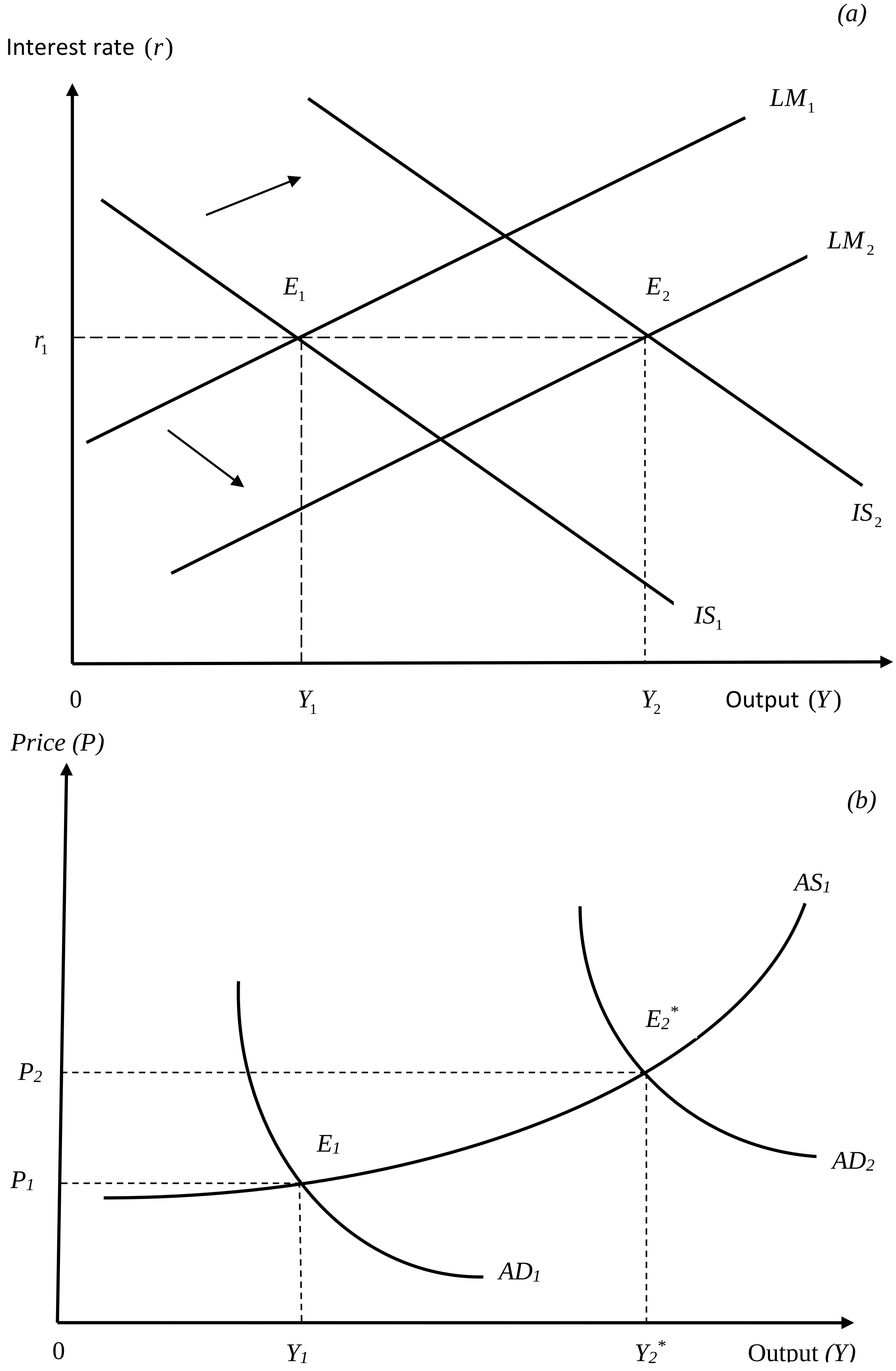
The above analysis assumes the standard AS-AD model. However, note that the aggregate supply curve for a standard developing country is likely to be relatively flat for the following two reasons: one, nominal wages tend to be rigid in developing countries, accompanied by an excess supply of labour; and two, existence of idle capacity in these countries suggests that there are no significantly diminishing marginal returns for labour in the relevant range of production (Porter and Ranney, 1982, p. 753). The implication of this quite flat aggregate supply curve and sensitive aggregate demand to changes in disposable income (as discussed earlier) is that expansionary fiscal policy will have a very significant impact on output and an insignificant impact on the price level for a standard developing country.

Furthermore, the above analysis has assumed that fiscal deficits are bond financed. As we have seen, this form of deficit financing is associated with a rise in interest rate, which in turn results in the some crowding out of private investment and/or net exports. However, if some economic resources are initially unemployed or underemployed, and there is a possibility for output to increase, the interest rate may not rise at all, and there may not be any crowding out problems when monetary authorities can accommodate the fiscal expansion (Dornbusch, Fischer, and Startz, 2001). Monetary policy is accommodating when, in the course of expansionary fiscal policy, the money supply is also increased in order to prevent interest rates from increasing. Monetary policy accommodation is also referred to as *monetizing fiscal deficits*, meaning that the government or central bank prints money to buy bonds with which the government pays for its deficits. In effect, when monetizing fiscal deficits, the government prints money to finance its spending while avoiding competing with the private sector for the available financial resources in the economy, so that there is no crowding out of private investment. The impact on output of monetary accommodation of fiscal expansion is illustrated in Figure 3.2 below.

When monetary policy accommodates a fiscal expansion, both the IS curve and the LM curve shift to the right from IS_1 to IS_2 and LM_1 and LM_2, respectively, as Figure 3.2(a) shows. This results in a rightward shift in the aggregate demand curve from AD_1 to AD_2 as illustrated in panel *(b)* of Figure 3.2. If the monetary authorities can fully accommodate fiscal expansion then interest rate and aggregate supply need not change, hence allowing the full multiplier effect. In the standard AS-AD model, this increases output significantly to output level Y_2^* in Figure 3.2. This means that, when some of the economic resources are unemployed or underemployed, there is a possibility that deficit spending financed by an increase in money supply can result in a large impact on output.

Thus, following the above assessment of the impact of fiscal deficits on output and economic growth when deficits are either bond-financed or accommodated by monetary policy, we argue that, while both results in a net increase in national output, and therefore growth, it is monetised deficits that will most likely have a more significant impact on output and growth.

Figure 3.2: Monetary accommodation of fiscal expansion and its impact on output



Sources: Porter and Ranney (1982), Dornbusch *et al*. (2001) and Mankiw (2007)

Analysis of the Keynesian framework as discussed above suggests that expansionary fiscal policy mainly affects the economy's transitional growth rate while the steady-state growth rate remains unaffected – that is, it affects the level of output and output growth in the short-run rather than the long-run growth rate (Kneller *et al*., 1999; Odedokun, 2001; Agenor, 2004; Benos, 2009).

However, recent developments in public-policy endogenous growth models of Barro (1990), Barro and Sala-i-Martin (1992, 1995, 2004), Cashin (1995), Devarajan *et al*. (1996); Mendoza *et al*. (1997) - among others, have provided/explained mechanisms by which fiscal policy can affect both the level of output and output growth in the short-run and the long-run growth rate of the economy (Devarajan *et al*., 1996; Kneller *et al*., 1999; Odedokun, 2001; Agenor, 2004; Benos, 2009).[9]

Literature on these public-policy endogenous growth models generally classifies fiscal policy into the following broad categories: (a) *distortionary taxation*, which affects the investment decisions of private agents, hence distorting the long-run growth rate of the economy; (b) *non-distortionary taxation*, which does not affect the investment (or saving) decisions of private agents (following the assumed nature of private agents' utility function, and hence has no effect on the long-run growth rate; (c) *productive expenditures*, that affect economic growth directly by increasing the economy's capital stock (e.g. public investment in infrastructure) or

[9] This is in contrast to the *neoclassical growth models* of Solow (1956) and Swan (1956) which established that the steady-state economic growth rate (or the economy's long-run growth rate) can only be determined by the exogenous factors of *physical capital accumulation*, *population (or labour force) growth* and *technological progress*, while policies such as fiscal policy can only affect the transitional path towards this steady-state (Kneller *et al*., 1999; Odedokun, 2001).

indirectly by raising the marginal productivity of private capital (e.g. spending on education, health, and other services that contribute to the accumulation of human capital); and, (d) *unproductive expenditures* that, though increasing household utility, do not affect the marginal product of private capital, and hence economic growth (Barro, 1990; Barro and Sala-i-Martin, 1992, 1995; Turnovsky and Fisher, 1995; Kneller *et al*., 1999; Agenor, 2004; Adam and Bevan, 2005; Benos, 2009).

Predictions from these endogenous growth models are that, an increase in productive expenditure financed by non-distortionary taxes will be growth promoting, whilst the growth-effect is ambiguous if distortionary taxation is used to finance this increase in productive spending. On the other hand, an increase in unproductive expenditure financed by non-distortionary taxes will be neutral for economic growth, whereas the effect on economic growth will be negative if distortionary taxation is used to finance this increase in unproductive spending (Barro, 1990; Turnovsky and Fisher, 1995; Kneller *et al*., 1999; Agenor, 2004; Adam and Bevan, 2005; Benos, 2009).

However, the theoretical literature on this topic fails to clearly identify exactly which taxes and public expenditures are distortionary/non-distortionary and productive/unproductive, respectively, and instead different studies only attempt to hypothesise ‘potential’ candidates for these categories of tax and expenditure based on the assumptions made, and leave the empirical evidence to determine these. For example, in allocating public spending to productive/unproductive categories based on an economic classification, Devarajan *et al*. (1996, p. 320) treats *capital expenditure* (which is considered to complement private sector production) as productive, whereas *government consumption expenditure* (much of which is considered to enter the household's utility function) as non-productive. Following the same criteria for economic classification of public expenditure as Devarajan *et al*. (1996)[10] but with slightly different components, Ghosh and Gregorios (2009) consider *capital expenditure plus consumption spending on education and health* as productive and *government consumption spending less the amounts spent on education and health* is considered as non-productive.[11] In another study, Kneller *et al*. (1999, pp. 176-178) consider the functional classification of public expenditure and hypothesize that public expenditures with substantial physical and human capital component such as *spending on transport and communication, general public services, education, health, and housing* are productive expenditures, while *social security and welfare expenditure* and *expenditure on recreation, culture and religion* are non-productive expenditures (*see Appendix B for more detailed theoretical aggregation of functional classification of taxes and public expenditure by* Kneller *et al.* (1999)). Then, contrary to the above studies (Devarajan *et al*., 1996; Kneller *et al*., 1999; Ghosh and Gregorios, 2009) which imposes a theoretical classification of government expenditure (and taxes) a priori, Benos (2009) argue that theoretical literature is not clear about the classification of various functional categories of government

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[10] That expenditure that enters the production function is considered productive and expenditure that enters the utility function is treated as non-productive.

[11] In an earlier study, Barro (1991) considered government consumption less the amounts spent on education and defence as a proxy for public spending that enters into the household utility function and public investment plus the amount spent on education and defence as a proxy for government expenditure that enters the production function. The treatment of defence spending as productive in this study is based on the assumption that it helps to protect property rights (Barro 1991; Ghosh and Gregoriou, 2009, p. 10).

spending, and thus simply mention them leaving the estimation results to determine which of these government spending categories are productive and unproductive (*see Appendix C for theoretical functional classification of fiscal policy instruments by Benos, 2009)*.[12]

In another attempt to distinguish between productive and unproductive government expenditures, Chu *et al*. (1995) categorise these two types of spending based on the 'efficiency' of the public sector in using its resources in production or procurement and for administration.[13] They argue that the following two conditions are essential for government spending to be productive: *First*, public expenditure programmes or projects must be cost-effective; that is, they should be designed and implemented to provide given levels of output or achieve specific objectives at the lowest possible cost. As Chu *et al*. (1995) argue, for this condition to be satisfied "the public sector must use human and other resources fully and effectively; that is, it must not waste any economic resources (Chu *et al*., 1995, p. 4). *Second*, for government expenditures to be productive, the mix of outputs should be appropriate or optimal; that is, the government should not produce too much of one good and too little of another.

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[12] As pointed out/ demonstrated by Benos (2009), and based on the above survey of literature on the distinction between productive and unproductive government spending, we argue that the theoretical literature is indeed not very clear about the classification of different types of government expenditure into productive and unproductive spending and that it is better to leave the empirical estimations to determine which categories of government expenditure are productive and unproductive.

[13] It is worth noting that Chu's *et al*., (1995) analysis here is based on the assumption that public sector activities involve direct production of public goods (e.g. economic stabilisation, judicial services, national defence etc.) and provision of public goods that are produced by private sector (i.e. procures from private sector). Public sector provision through private sector production, for example, can be contracting out the running of prisons to the private sector, purchase of military equipment from the private sector, etc. (Chu *et al*., 1995, pp. 3-4).

Chu *et al*. (1995) use the above definition of productive public expenditures to conceptualize unproductive government expenditures as those that are associated with wastage of resources and an inappropriate mix of public sector output. As Chu *et al*. (1995) further argue unproductive government expenditures can be caused by various factors including inadequate checks and balances in the political and budgetary processes, lack of a well-trained civil service and corruption among others. One example of unproductive government expenditure based on the Chu *et al*. (1995) definition of unproductive expenditures would be generalised subsidies or benefits that target the whole population, including those in the middle and upper class income groups. These subsidies, may enhance political support and election prospects for the government in power, but are an inefficient or unproductive way of supporting the poor. It follows therefore that, replacing these generalised subsidies or benefits with those that target the poor would improve the efficiency of the public sector spending (providing that these subsidies or benefits do not have a strong adverse effect on the incentive to work). Other examples of unproductive expenditure based on this definition would include spending on "white elephant" projects[14], spending on vastly underutilised infrastructure requiring large operating costs, spending that finances large and ineffective bureaucracies, and government transfers to loss-making public enterprises that reward certain political groups or benefit particular regions at the expense of the wider population (Krueger, 1990; Nelson and Singh, 1994; Chu *et al.*, 1995).

[14] These can be defined as large and expensive prestigious projects that do not serve useful economic or social objectives.

Analysis of the above categorisation of productive and unproductive government expenditures by Chu *et al*. (1995) shows that even seemingly productive expenditures as defined in the endogenous growth literature cited above could become unproductive if used inefficiently when they are associated with wastage of resources or if the mix of output is not appropriate. In fact, in their empirical study, Devarajan *et al*. (1996) distinguish between productive and unproductive government expenditures based on output elasticities and confirm that seemingly productive expenditures could become unproductive if used in excess.

However, analysis also shows that assessing government expenditures based on the definition provided by Chu *et al*. (1995) may not be that straightforward due to a number of practical difficulties involved. For example, it is difficult to measure or value public sector output, especially for public goods such as national security or the output of justice system, health and education services. This assessment is even further complicated by the fact that many public sector operations (programmes or projects) serve more than one objective (for example, transport infrastructure serving both economic and defence objectives) and/or can have economic implications which are not directly related to their main objectives. Moreover, identifying an appropriate mix of public sector outputs in most cases is very difficult and requires value judgements (Chu *et al*., 1995, p. 7).

Given this debate and the practical difficulties involved in distinguishing between productive and unproductive government expenditures, it appears that, while the above theoretical/analytical classification between these two types of spending provides some clue as to the likely growth effects of these types of spending, the issue of identifying productive and unproductive spending is ultimately an empirical one.

Much empirical work has been done to distinguish between productive and non-productive government expenditure (e.g., Landau, 1983; Aschauer, 1989; Barro, 1989, 1990, 1991; Easterly and Rebello, 1993; Nelson and Singh, 1994; Barro, 1995; Devarajan *et al*., 1996; Kneller *et al*., 1999; Odedokun, 2001; Ghosh and Gregoriou, 2006; Benos, 2009). It is worth-noting that this empirical literature reveals the following two features: one, following the lack of clarity in the theoretical literature on the classification between productive versus unproductive, most of these studies (e.g., Devarajan *et al*., 1996; Miller and Russek, 1997; Ghosh and Gregoriou, 2006; Benos, 2009) refrain from a priori classification of expenditure into productive and non-productive and leave the data/estimation results to determine which components of government expenditure are productive and which ones are unproductive; and two, as pointed out by Adedokun (2001, p. 3) there is still a lack of unanimity in the empirical findings – for, the results often conflict with one another. However, despite this lack of unanimity in the empirical results, there is a general consensus among many of these empirical studies that public spending on transport and communication investment, human capital enhancing activities such as education and health, and spending on research and development are more likely to be productive, and therefore growth enhancing (Aschauer, 1989; Easterly and Rebello, 1993; Nelson and Singh, 1994; Barro, 1995; Sach and Warner, 1997; Gallup *et al*., 1998; Prunera, 2000), whereas certain elements of government consumption expenditure are most likely to be negatively associated with growth, and are therefore non-productive (Landau, 1983; Barro, 1989).

One important implication of the above-discussed theoretical predictions and empirical findings from public-policy endogenous growth studies is that the impact of deficit spending policy on economic growth may depend on what the deficit financing is used for. That is, running deficits to finance productive expenditure or something that is going to increase the economy's productive capacity could have a significant positive impact on growth, while deficit financing on non-productive expenditure or wrongly conceived and counterproductive projects and wasteful government spending (such as financing large bureaucracies) could be deleterious to growth (Nelson and Singh, 1994; Prunera, 2000).

To summarise on the main implications of the Keynesian analysis of fiscal deficits, under the assumptions that a significant fraction of the population is either myopic or liquidity constrained and that individuals have very high marginal propensities to consume out of their current disposable incomes (so that aggregate consumption is very sensitive to changes in disposable income), Keynesians believe that appropriately timed fiscal deficits can have a significant positive impact on output, and therefore economic growth. The Keynesians' view, however, seems to only explain the impact of deficit spending on the level of output and growth during the transition to the steady-state and not the long-run or steady-state economic growth rate. However, more recent developments in the public-policy endogenous growth theory addresses this limitation of the Keynesian analysis by explaining channels through which, if well used, fiscal deficits can influence both the growth rate during the transition and the long-run growth rate by affecting the productivity of investment. The Keynesian and endogenous growth framework, therefore, suggests that *appropriately timed* and *used* deficits can have positive and significant impact on economic growth.

3.2.2 The Neo-Classical Perspective

In another viewpoint, Neo-classical economists believe that deficit spending has little or no effect on output and employment, especially in the long-run, and that it primarily results in the crowding out of domestic private investment or net exports.

The Neo-classical analysis of fiscal deficits is based on the assumptions that individuals are farsighted and plan consumption over their own life cycles, and that markets clear in all periods (that is, economic resources are fully employed). Under these conditions, deficit spending raises total lifetime consumption of farsighted individuals by shifting taxes to future generations, and since economic resources are fully employed, increased consumption necessarily implies reduction in savings. Consequently, domestic interest rates must increase until the monetary side of the economy is brought back into balance. In this situation, therefore, fiscal deficits have little or no impact on output (and therefore economic growth) and primarily result in crowding out problems (Chrystal and Thornton, 1988; Bernheim, 1989; Prunera, 2000).

There are three different mechanisms by which crowding out can occur under the Neo-classical framework. First, in a closed economy, a switch from tax to deficit finance raises real interest rates and crowds out private investment. Second, in a small open economy with internationally mobile capital, net exports rather than domestic investment are crowded out. Deficits place upward pressure on interest rates, which induces an inflow of foreign funds. With flexible exchange rates, an influx of capital causes the exchange rate and therefore domestic currency to appreciate, which in turn diminishes the competitiveness of domestic products in the world markets. As argued earlier, however, in a large open economy, both mechanisms are likely to be operative. Finally, with full employment conditions, an increase in aggregate demand leads to an increase in the price level (moving upward along the supply curve). This increase in price level reduces real balances, thus shifting equilibrium in the money market to a lower level. Consequently, interest rates rise until the initial increase in aggregate demand is fully crowded out. Note that, this third form of crowding out is not expected to occur under the Keynesian model. This is because output in this model is assumed to be below the full-employment level, which means that, when fiscal expansion increases aggregate demand, firms can increase the level of output by hiring more workers, and thus it is possible that prices can remain constant (Dornbusch, Fischer and Startz, 2001, p. 253).

As we have seen in the discussion above, the central argument in the Neo-classical analysis is that fiscal deficits merely result in the crowding out of the interest-sensitive components of aggregate demand (particularly, domestic private investment and net exports), which in turn slows down the economic growth. In addition, however, Neo-classical economists have shown concern about the potentially harmful macroeconomic effects of ways of financing fiscal deficits as discussed in Chapter Two (section 2.2). According to these economists, printing money to finance the deficit can result in high rates of inflation when money growth is above the level the non-government sector wishes to hold.[15] Domestic borrowing can cause interest rates to rise and crowd out the private sector. External borrowing can end in debt crises.[16] The use of foreign reserves may provoke capital flight thus causing balance of payments problems (Eisner, 1989; Fischer and Easterly, 1990; Weiss, 1995). Clearly, deficit financing that leads to these macroeconomic imbalances (i.e. high interest rates, high inflation, debt crisis, and balance of payments problems) can be very detrimental to economic growth.

To summarise the main implications of the Neo-classical viewpoint, based on the assumptions that individuals are farsighted and plan their consumption over their own lifecycle, Neo-classical economists believe that deficit financing raises total lifetime consumption by shifting taxes to subsequent generations. However, based on the well-known Neo-classical assumption that economic resources are fully employed, this increase in consumption simply causes interest rates to rise, thus causing crowding out of the domestic private sector or net exports. In this situation, therefore, deficits will have little or no impact on output and economic growth.

[15]As discussed earlier, inflation reduces real money balances (real money supply). This reduction in real money, in turn, causes interest rates to rise, thus reducing expenditures in interest-sensitive sectors of the economy.

[16] The experience of "debt crisis" of the 1980s, which forced many countries to reschedule their debt obligations, illustrates the danger of excessive reliance on external borrowing in financing budget deficits (Fischer and Easterly, 1990; Weiss, 1995).

Neo-classical analysis imply that the economy cannot experience sustained economic growth – i.e., it can experience economic growth only until it reaches the steady-state point (the economy's long-run growth rate). However, note that, as discussed earlier, recent development in the endogenous growth theory have shown that economies can experience sustained growth, and that there are channels (e.g. spending in the areas which increases the productive capacity of the economy such as public investment in infrastructure, spending on human capital development, and spending on research and development) through which fiscal policy can affect the long-run growth (Barro, 1990; Barro and Sala-i-Martin, 1992, 2004; Kneller *et al*., 1999; Odedokun, 2001).

3.2.3 The Ricardian Perspective

The discussion so far has considered the models in which it is believed that fiscal deficits do have effects on the macroeconomy. In contrast, the Ricardian model (also called the Ricardian equivalence hypothesis) argues that fiscal deficits are irrelevant in the determination of macroeconomic performance – that is, they leave all macroeconomic variables, including output and economic growth unchanged (Barro, 1974, 1989; Chrystal and Thornton, 1988; Bernheim, 1989).

Under the Ricardian model, successive generations are linked through voluntary and altruistically motivated resource transfers. This assumption has important implications that families are seen as dynastic units (that is, each family is thought of as a single, infinite-living agent), and that consumption is determined as a function of dynastic resources. Based on these assumptions, Ricardians argue that any increase in the government debt generated through borrowing to finance deficit spending will be considered as an increase in the personal liabilities of the general public through implied future taxation. Thus, when fiscal deficits are increased, the rational and far-seeing consumers, who also care enough about their future prosperity and the prosperity of future generations, will decrease their current consumption expenditure by the same amount in order to increase savings to cover the implied future tax burden. Consequently, budget deficits will have no real effects on aggregate demand, and therefore on output and economic growth. This means that, in the IS-LM framework, the IS curve does not shift following fiscal expansion (Barro, 1989; Bernheim, 1989; Fischer and Easterly, 1990).

3.2.4 A Critical Assessment of the above three Theoretical Perspectives on the Impact of Fiscal Deficits on Economic Growth

In assessing the above theoretical perspectives on the impact of fiscal deficits on economic growth, we argue that the Ricardian perspective is based upon unrealistic assumptions, which makes it an unacceptable approximation to reality. In fact, a number of studies (such as, Bernheim and Bagwell, 1988; Bernheim, 1987, 1989; and, Barro, 1989) have dismissed the Ricardian framework on the grounds that the assumptions on which it is based are very unrealistic and difficult to be met in the real world. According to the literature, there are at least five main criticisms that have been raised against the Ricardian framework and its conclusions. These are discussed below.

The first and main criticism is that the structure of families assumed in the Ricardian analysis is very unrealistic. Ricardian analysis takes each dynastic family to be an independent and self-contained unit. However, this is not true; for, propagation of the human species usually requires the participation of two unrelated individuals, which makes family linkages form more complex networks than assumed in the Ricardian analysis. It follows therefore that each individual belongs to many dynastic families in which unrelated individuals share common descendants. Hence, due to the linkages between families, it is generally difficult to represent any particular family or set of families as a single, utility-maximising agent, even when the welfare of each individual is assumed to depend only on his or her own consumption and the welfare of his or her children (Bernheim, 1989). Bernheim, citing, Bernheim and Bagwell (1988) also demonstrates that the central conclusion in the Ricardian analysis, which essentially establishes the insensitivity of consumption to the distribution of bequests over family members, depends only upon the existence of altruistically motivated resource transfers between dynastic family members, and not upon a particular structure of the family tree. But then the existence of the aforementioned linkages between families gives rise to very strong neutrality properties under weaker conditions than those assumed in the Ricardian framework. Thus, the existence of linkages between families implies that the Ricardian dynastic framework does not provide an acceptable analytical tool for studying public policy issues.

The second objection against the Ricardian framework has been directed to the two Ricardian assumptions regarding inter-generational transfers - that most of the individuals either voluntarily make or receive intentional transfers (as opposed to accidental transfers, which result from uncertainty about the date of death), and that these transfers are purely motivated by altruism. One important objection to the Ricardians' assumption of inter-generational transfers has been that some people, especially those without children, are not connected to future generations, and hence do not have the bequest motive. Hence, those in this situation should be expected to become wealthier when the government substitutes a budget deficit for taxes (Tobin and Buiter, 1980; Bernheim, 1989). If this were true, then deficit spending policy will have real economic effects. On the altruism assumption, a number of studies have suggested that many existing transfers are motivated by accidental reasons other than altruism. Studies by Darby (1979), Kotlikoff and Lawrence (1981) and Bernheim (1989), for example, find the possibility that many bequests are not intentional, but rather accidental (that is, they result from uncertainty about the length of individuals' lives, coupled with the existence of incomplete annuity markets). Others suggest alternative motivations for resource transfers, including intra-family exchanges, tastes for generosity, or as a strategic move whereby parents influence their children to behave properly. Indeed, each of these transfers could potentially undo the Ricardian's framework central conclusions.

The third objection is that, contrary to the Ricardians' assumption, an individual's future taxes and income are uncertain. This uncertainty about an individual's future taxes (or the complexity in estimating them) implies a high rate of discount in capitalising these future liabilities (Feldstein, 1976; Wagner, 1977; Barro, 1989). In this situation, therefore, substitution of a budget deficit for current taxes raises net wealth since the present value of the expected future taxes becomes less than the current tax cut (Barro, 1989, p. 45). Following this, then, fiscal deficits raise aggregate consumption and reduce desired aggregate savings. In addition, one may argue that, given the fact that in reality individuals are uncertain about future income and hence uncertain about whether they will make or receive a transfer, then it should be expected that re-distribution of resources between generations can have real effects.

The fourth objection is that private capital markets are not perfect as assumed in the Ricardian model, but rather imperfect with the typical individual's real discount rate exceeding that of the government. As a number of studies (such as Mundel, 1971; Dotsey, 1985 – among others) have established, the existence of an imperfect private capital market has an important implication for the analysis of public debt. This is because, as Dotsey (1985) argues, when consumers are liquidity constrained, increase in government debt can have a real effect under imperfect market conditions. According to Dotsey, individual consumers cannot always borrow to the extent they desire because capital markets may not lend them money based on future risky income streams. If this were the case, deficits can have real effects since some individuals in the society would like to consume more of their wealth, but are constrained to do so. It follows, therefore, that a tax cut now with an appropriate increase in the future is like making a loan to the individuals who are liquidity constrained. Since these individuals are constrained, they will increase their consumption by at least some portion of the tax cut, and so aggregate demand increases.

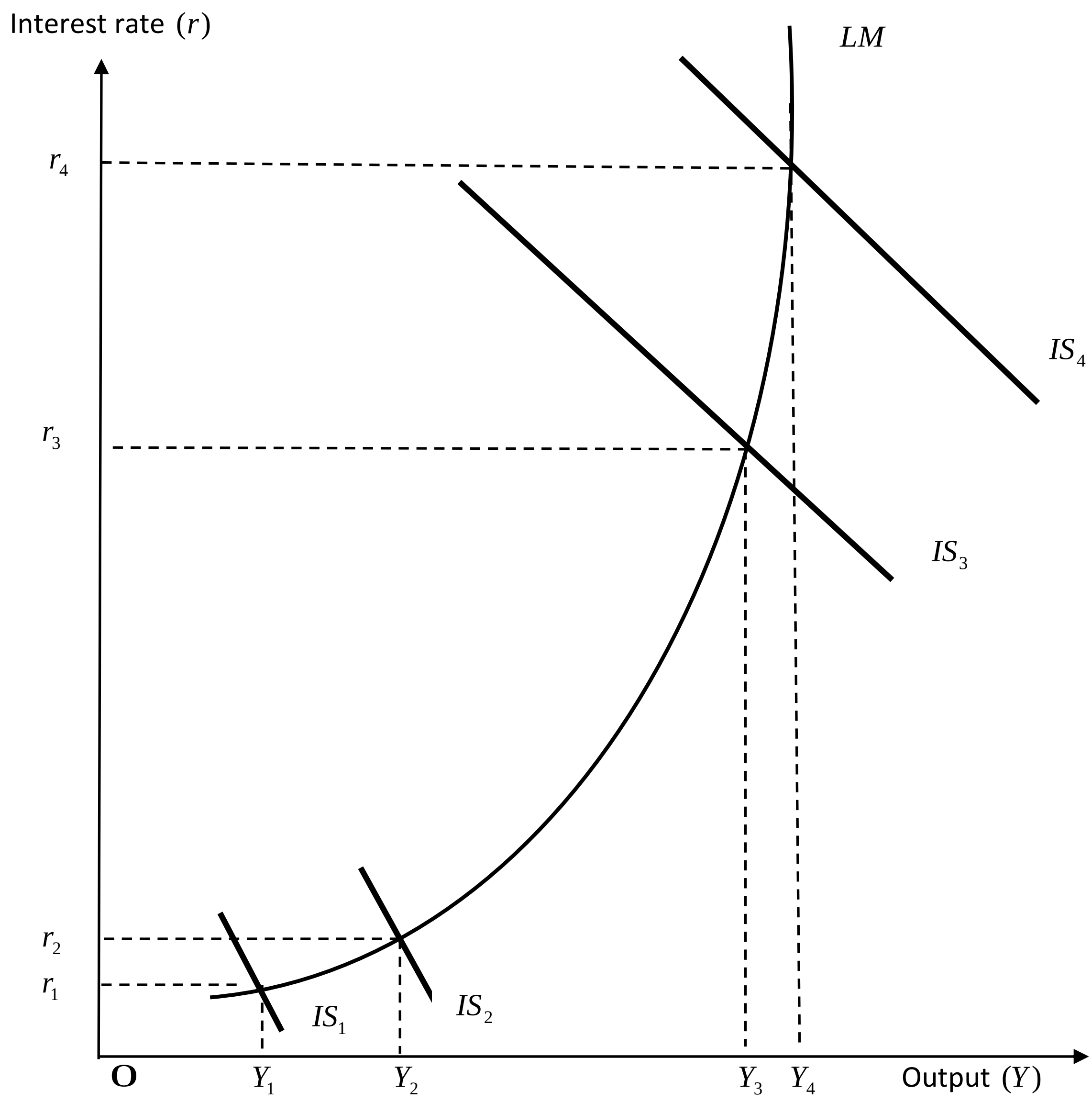
Finally, the fifth criticism of the Ricardian analysis is the fact that not all taxes are lump sum as is implicitly assumed in the Ricardian model. For instance, taxes that typically depend on incomes, spending or wealth are clearly not lump sums. The existence of non lump sum taxes can indeed lead to economic consequences of fiscal deficits that are non-Ricardian. Taking the case of income tax for example, government budget deficits change the timing of income taxes, thereby affecting people's incentives to work or produce in different time periods. It follows therefore that tax cuts that are covered by variations in deficits will have real effects on the economy.

In light of the above criticisms against the key assumptions on which the Ricardian framework is based, we argue that this framework is based on unrealistic assumptions, and thus its conclusions on the effects of fiscal deficits on macroeconomic performance do not offer an acceptable approximation to reality. Hence, in our view, it is the Keynesian and Neoclassical frameworks which provide the most relevant starting point for an analysis of the impact of fiscal deficits on economic performance, including economic growth.

In assessing the Keynesian and Neoclassical perspectives, however, we argue that these frameworks consider, and therefore represent, two distinct aspects of fiscal policy. The Keynesian framework concerns the short run when some economic resources are unemployed or underemployed. In this situation, expansionary fiscal policy will most likely have a significant impact on output and therefore economic growth, especially when the economy is operating far below full employment. On the other hand, the Neoclassical framework concerns the long run when an economy is taken as operating close to or at the full employment level. Expansionary fiscal policy in this case will most likely be dominated by crowding out problems, with little or no impact on output and growth.

In fact, the assumptions on which the Keynesian and Neoclassical frameworks are based have certain implications for the income and interest elasticities of money and investment, and these, in turn, have implications for the slopes of IS and LM curves and the effectiveness of fiscal policy. For the Keynesian framework, since a significant fraction of the population is thought to be liquidity constrained, the LM curve is relatively horizontal, and thus a fiscal expansionary action has a large multiplier effect on the equilibrium level of income. There is less change in the interest rate associated with expansionary fiscal policy, and thus interest-rate sensitive components of aggregate demand (such as private investment and net exports) are not adversely cut off. There is therefore less dampening of the effects of deficit spending on output. On the other hand, in the Neoclassical framework, the LM curve is relatively vertical, and an expansionary fiscal policy has an insignificant effect on the equilibrium level of income and increases the interest rate significantly. It follows therefore that an expansionary fiscal policy shifts the IS curve upwards but has no significant impact on output. With unconstrained consumers, demand for money is insensitive to the interest rate, as a relatively vertical LM curve implies, and thus there is a somewhat unique level of income at which the money market is in equilibrium. In the extreme Neoclassical case, where the LM is vertical (perfectly inelastic), fiscal expansion cannot change the equilibrium level of income and raises only the interest rate. But if fiscal expansion does not increase output, there must be an offsetting reduction in private spending. In this case, the increase in interest rates crowds out an amount of domestic private spending and/or net exports equal to the size of fiscal expansion. Thus, there is full crowding out if the LM curve is vertical. Figure 3.3 illustrates the above conclusions concerning the efficacy of deficit policy on income when initiated at low and high levels of output relative to full employment output.

Figure 3.3: The efficacy of deficit policy at relatively low and high levels of output

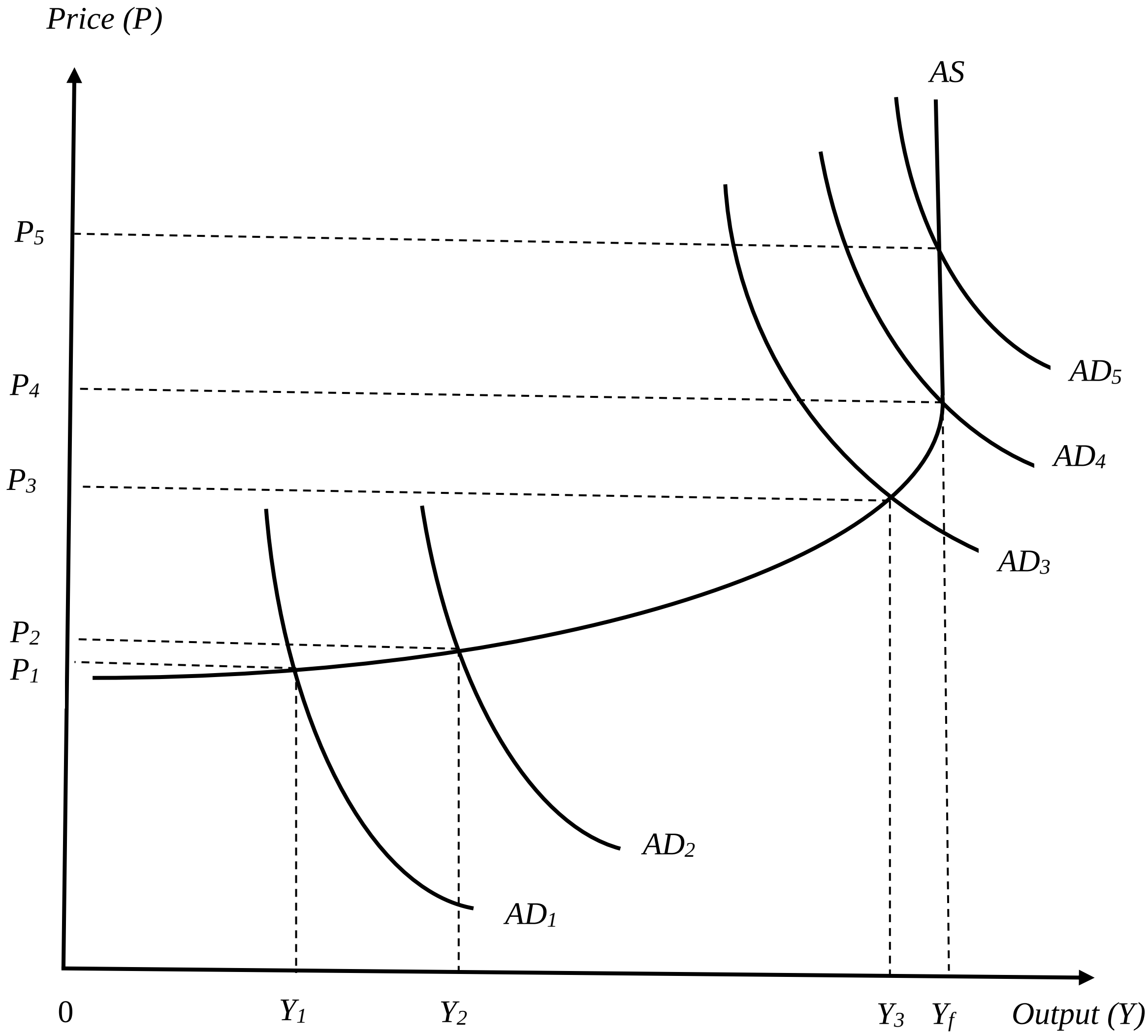


Source: Dornbusch *et al*. (2001) and Mankiw (2007)

At low levels of economic activity such as Y_1, the LM curve is relatively flat. A fiscal expansion, which shifts the IS curve from IS_1 to IS_2 will result in a large multiplier effect (from Y_1 to Y_2) since the money market effects are relatively absent. In contrast, however, at high levels of economic activity (when the economy is near full employment) such as Y_3, the LM curve is relatively interest-inelastic since there is no interest- elastic speculative demand as demand for money consists of transactions demand only. In this scenario, fiscal expansion will cause a significant increase in interest rates (from r_3 to r_4) which, in turn, will cause large crowding out effects. Consequently, the effect of fiscal expansion on output will be very small (from Y_3 to Y_4). Once the economy is at full employment, say $Y_4 = Y_f$, the LM curve is perfect inelastic - i.e. interest inelastic – and any fiscal expansion will have no any effect on output. As the above figure clearly illustrates, therefore, a given fiscal expansion will yield a significant increase in output when the economy has high levels of unemployment. In contrast, when the economy is near (or at) full employment, fiscal expansion will have little (or no) effect on output, with a large increase in the interest rate squeezing out interest sensitive components of aggregate demand to nearly or equal the initial fiscal stimulus.

To make the same point somewhat differently, we can illustrate the efficacy of the deficit spending policy (expansionary fiscal policy) on output and economic growth in the short-run and long-run scenarios using the AS-AD model as figure 3.4 below shows. In the short-run (Keynesian case) when the economy operates below full employment (Y_f), expansionary fiscal policy will most likely have a positive impact on output and economic growth. In the extreme case, when the economy operates far below full employment, the price level will be little affected and the impact on output, and therefore economic growth, will be very significant. In the long-run (Neo-classical case) when the economy operates near or at full employment (Y_f), expansionary fiscal policy will have very little or no impact on output and therefore growth.[17]

Figure 3.4: The Efficacy of deficit spending policy on Output



Source: Dornbusch *et al*. (2001) and Mankiw (2007)

On the basis of the above assessment of the three main perspectives on the impact of fiscal deficits on economic growth, we argue that the Ricardian framework does

[17] Note that, when the economy is at full employment (natural rate) only the price level adjusts following this policy change (Mankiw, 2007).

not provide relevant analysis of the impact of fiscal deficits on economic growth on the grounds that it is based on the assumptions which are unrealistic and far from the reality. In our view, it is the Keynesian and Neo-Classical frameworks which offer the most relevant starting point for an analysis of the impact of fiscal deficits on economic growth, but with the two frameworks concerning two distinct aspects of fiscal policy of short run and long run, respectively. However, it should be emphasised that, although these two frameworks provide some clue about the likely effect of fiscal deficits on economic growth, the exact effect of deficit spending policy on growth may depend on a number of other factors, as discussed earlier, particularly the way the deficits are financed, what deficit financing is used for, and the size of deficits.

Further analysis of the literature, however, shows that even the Keynesian and Neo-Classical frameworks as discussed above mainly explains the economy's transition growth rate and not the steady-state growth rate – i.e., they explain how expansionary fiscal policy affects the level of output and output growth in the short-run rather than the long-run growth rate of the economy, with the long-run growth rate being able to be explained using endogenous growth models (Barro, 1990; Barro and Sala-i-Martin, 1992, 1995, 2004; Cashin, 1995; Devarajan *et al*., 1996; Mendoza *et al*., 1997; Kneller *et al*., 1999; Odedokun, 2001; Agenor, 2004; Benos, 2009). As discussed earlier, note that these recently developed endogenous growth models have provided/explained mechanisms by which expansionary fiscal policy can affect both the level of output and output growth both in the short-run and the long-run growth rate of the economy (Devarajan *et al*., 1996; Kneller *et al*., 1999; Odedokun, 2001; Agenor, 2004; Benos, 2009).

It is also worth noting that while the Keynesian and Neo-classical frameworks provide the most relevant starting point for an analysis of the likely effect of fiscal deficits on economic growth, over the past few decades, some macroeconomists – the so-called *Structural Macroeconomists* such as Lance Taylor and Jose Antonio Ocampo - have shown a serious and growing concern on the relevance of the traditional Keynesian and Neoclassical analysis of fiscal policy for developing countries due to the certain structural constraints that face these countries. The structuralist views on these constraints and their implications on a standard developing country macroeconomic model have been well discussed by Porter and Ranney (1982) and Jha (2003). In fact, following the analysis of these constraints, Porter and Ranney (1982) and Jha (2003) argue that while the standard text-book IS-LM and AS-AD models (as the ones used in our analysis above) may be appropriate for the analysis and macroeconomic policy prescriptions for developed countries, applying them in the context of a standard developing country may yield non-standard results. Some of these economic constraints and their implications on the standard developing country aggregate supply and aggregate demand functions, as discussed in Porter and Ranney (1982) and Jha (2003), are briefly reviewed below.

Starting with the supply side constraints, aggregate supply of any economy depends mainly on the structure of both product and labour markets, the entrepreneurial behavior, and production relationships (Porter and Ranney, 1982, p. 752; Jha, 2003, p. 194). As further argued by Porter and Ranney (1982) and Jha (2003), developing countries are perceived by the structuralist economists to be different from developed countries in all these factors that affect the aggregate supply. In turn these differences, as discussed in Porter and Ranney (1982) and Jha (2003), are discussed below.

The structuralist view argue that the developing country product markets are generally characterized by oligopolistic rather than competitive behavior. This is because; for non-tradables, the small economic size of the developing country economies prevents the existence of a sufficient number of firms to ensure competitive behavior; and, for tradable goods, governments usually provide to domestic firms some forms of protection (e.g. tariff protection, import licensing) from foreign competition. The structuralist view also argue that labour markets in developing countries are notoriously imperfect, hence leaving the money wage in the modern sectors of these economies less responsive (i.e. rigid) to economic forces, at least in the short-run, and a significant part of the labour force unemployed, underemployed or, in some cases, employed at much lower wage rates. All this leads to a general situation of persistent excess supply of labour in these countries.

Furthermore, the structuralist economists have the following two views on the entrepreneurial behavior in developing countries. First, the assumption of profit maximisation is less appropriate in developing countries and that some sort of variable cost markup pricing is more pertinent in these countries. Second, entrepreneurs in developing countries generally borrow funds in order to finance their variable costs, so that relevant factor prices for profit maximisation or markup calculations must include costs associated with interest.

In relation to the production relationships, industrial production in developing countries has heavily been dependent on imported materials and intermediate inputs for which domestic substitutes are not easily available. Since imported materials and intermediate inputs are important element of production cost, so is the exchange rate. It follows, therefore, that as the price of foreign exchange goes up, assuming other factors remain constant, it would be expected that the price of imported inputs will go up and hence supply will fall. Also, the majority view in developing-country macro models is that labour inputs, another important variable input in production, exhibit diminishing returns according to usual neoclassical production function (especially in the industrial sector) in these countries[18]. Other important distinguishing characteristics of production in developing countries is that cash borrowing largely finance working capital in these countries. Correspondingly, the rate of interest is an important determinant of the cost of working capital and, therefore, of aggregate supply.

The implications of these characteristics of the supply side of the economy in developing countries is that the standard developing country aggregate supply

[18] Note however that this view has been challenged on the basis that where idle capacity accompanies surplus labour, there may be a scope for increasing output without diminishing returns to labour where foreign exchange can be located to purchasing the needed raw material inputs (Porter and Ranney, 1982, p. 753).

curve is likely to be quite relatively flat as compared to the standard developed country aggregate supply curve (Porter and Ranney, 1982; Jha, 2003). This follows the following two aspects of the above discussion; first, nominal wages tend to be rigid in developing countries, accompanied by an excess supply of labour; and second, existence of idle capacity in developing countries suggest that diminishing returns to labour are not significant in these countries. It follows, therefore, that nominal wage rigidity flattens the aggregate supply curve in the usual Keynesian fashion; hence an increase in the price level leads to the reduction of real wages below the marginal product of labour, thus inducing an increase in employment and output. Given this, and if the marginal product of labour curve is quite flat, then the expansion of employment and output following an increase in the price level is likely to be quite large (Porter and Ranney, 1982).

As far as the demand side of the economy is concerned, the structuralist view is that aggregate demand in developing countries is also affected by some institutional problems that these countries face. Porter and Ranney (1982) and Jha (2003) discuss these institutional problems and their implications on aggregate demand by examining the equilibrium in the money market and goods market in the economy.

In the case of the monetary side of the economy, the use of money may not be that widespread and financial intermediation may not be that varied, complex and sophisticated as compared to developed countries (Porter and Ranney, 1982, p. 754). One other institutional constraint that developing countries have faced, especially in the past, is that government economic policy (e.g. financial repression and exchange rate controls) in many developing countries has acted to cause, and even in some cases worsen, the underdevelopment of the domestic financial sector. This financial underdevelopment of developing countries is reflected by a number of financial sector development indicators such as the low ratio of financial assets to income, the low number of banks which are also concentrated in urban areas, and the prevalent of a large part of investment which is self-financed, among others (Porter and Ranney, 1982, p. 754; Jha, 2003, p. 195).[19] These constraints have at least the following two important implications for monetary policy. First, a significant part of the financial activity in developing countries takes place outside the control of central bank and direct monetary policy reach. Second, open market operations are not very effective. Under these conditions, while the LM curve of the standard developing will have the usual upward slope much like the standard LM curve and that of developed countries, it will most likely be steeper (Porter and Ranney, 1982; Jha, 2003).

In relation to equilibrium in the developing country market for goods market, this occurs when domestic output equals the aggregate demand for it. This aggregate demand for domestic output consists of the usual four components: real consumer spending, business investment, government spending and net exports. According to Porter and Ranney (1982) and Jha (2003), developing countries differ from

[19] Note however that developing countries have made noticeable progress in addressing these constraints following the economic reform agenda since the 1980s and that economic policy measures such as financial repression and exchange rate controls are now rarely used (Spratt, 2009)

developed countries in each of these components. Some of these differences are as discussed below.

Real consumer spending in developing countries depends mainly on real disposable income, just as it does in the case of developed countries. However, for developing countries there are other two important determinants of consumer spending. First, consumption function depends on the functional distribution of income since, as it generally argued, the marginal propensity to consume out of wage income is higher than the marginal propensity to consume out of capital income (i.e. profits). Second, in contrast to developed countries, direct income tax is generally less important source of government revenue while indirect tax is a very important source of revenue in developing countries. Following these differences, Porter and Ranney (1982) and Jha (2003) argue that, aggregate consumption in developing countries depends not only positively on real disposable income, but also positively on labour share of total income and negatively on income tax rate.

As in developed countries, investment demand in developing countries is assumed to depend positively on the desired level of capital stock, which in turn depends positively on output. However, the financing of this investment in developing countries is very different from developed countries, for business firms in developing countries borrow investment funds from both official sources (such as commercial banks) and unofficial markets (curb markets). In additional, businesses in these countries raise significant part of capital investment through direct lending from the government and retained earnings from business profits. Hence the private investment in developing countries is a function of the desired level of capital stock (or output) and the cost of borrowing from all these sources of investment funds (Porter and Ranney, 1982; Jha, 2003).

In relation to government spending, large part of this is composed of wage payments, where the wage paid to public sector employees is kept in line with those in the private sector – and vice versa. It follows therefore that any decrease in the real wage bill would decrease real government expenditure. Another important component of government expenditure in developing countries is public investment. As such, government expenditure in developing countries is a positive function of both real wage bill and the level of public sector investment (Porter and Ranney, 1982; Jha, 2003).

Turning to the net exports component of aggregate demand, most developing countries are small relative to the rest of the world, and as such the domestic prices of their tradables depend on exogenously determined world prices, subsidies, tariffs and exchange rate. Also, because of capacity constraints and, at times, delays inherent in initiating or significantly increasing exports the price elasticity of supply of most developing countries exports is likely to be small in the short run (Porter and Ranney, 1982; Jha, 2003). It is further argued by Porter and Ranney (1982) and Jha (2003) that many developing countries imports and domestically produced goods are very poor substitutes. For most of the developing countries that have successfully pursued import substitution strategy now import largely non-competitive intermediate inputs, which can be treated as fixed proportion to domestic output. Two other important aspects of the developing countries trade sector can be pointed out. First, many developing country governments generate significant part of their revenues from the trade sector, with the large part of this revenue raised from ad valorem taxes on imports. Second, the trade sector of most developing countries is a very important part of national accounts, and thus many macroeconomic problems of developing countries seem in most cases to arise from a large deficit in the current account of the trade balance (Porter and Ranney, 1982).

As illustrated in Porter and Ranney (1982) and Jha (2003), taking into account all these characteristics of each component of aggregate demand for developing countries and incorporating them into the modelling of the equilibrium condition in the goods market (i.e. the IS equilibrium) will very likely yield quite steep IS curve for developing countries.[20] As pointed out by Porter and Ranney (1982, p. 758), there are two main reasons for this: first, the low short run interest elasticity of investment demand; and second, the high income elasticity of import demand.[21]

It follows, therefore, that combining the IS and LM curves for developing countries discussed above to derive aggregate demand will produce the aggregate demand curve that is likely to be much steeper than the standard text-book aggregate

[20] For details on this modelling of the IS curve for developing countries based on the structuralist views on the components of aggregate demand for these countries please see Porter and Ranney (1982, pp. 754-759) and Jha (2003, pp. 195-201).

[21] However, it is worth noting that this prediction contradicts what other studies have argued that the IS curve for developing countries may actually not be quite steep sloped for two reasons: first, the expected high marginal propensity to consume in these countries and, second, the likely high income elasticity of investment demand suggested by some empirical studies on developing countries (Behrman and Hanson, 1979; Leff and Sato, 1980).

demand schedule. Also, given these IS-LM and AD-AS models predicted for developing countries, it seems that applying the standard text-book/advanced country macro models and policy prescription for developing countries context may yield non-standard results (Porter and Ranney, 1982).

3.3 Empirical Evidence

It is interesting to note that one can find support for all three main theoretical perspectives concerning the impact of fiscal deficits on economic growth in the theoretical literature, political debates and the news media. Whether one thinks of deficits as growth enhancing or retarding, or even irrelevant in the determination of economic growth therefore depends fundamentally on one's choice of theoretical viewpoint. Given this therefore it is our view that while the selection of appropriate paradigm(s), as we have done in the previous section, provides researchers with some clue as to the likely effect of fiscal deficits on economic growth, the issue is ultimately an empirical one. Hence, this section critically examines the existing empirical literature on the impact of fiscal deficits on economic growth.

Analysis of the literature shows that two main approaches have dominated in the existing empirical studies concerning the impact of fiscal deficits on economic growth. The first approach estimates the so-called *St. Louis* equation. This approach was particularly used in the earlier studies on the effectiveness of fiscal and monetary policies in determining economic growth. Most of these studies were specifically concerned with testing hypotheses relating to the *magnitude, speed* and *reliability* of the response of GNP or GDP to changes related to fiscal and monetary actions. The second approach analyses the impact of fiscal deficits (or fiscal policy in broad terms) based on the estimation of different versions of growth models. Following recent developments in growth theory, these studies consider a richer menu of explanatory variables that are considered important in explaining economic growth. Given its advantages, this second approach has dominated in the more recent studies. Taking these in turn, the discussion below considers the empirical evidence based on the estimations of these models.

3.3.1 Evidence Based on Estimation of St. Louis Model

The St. Louis equation is associated with the Federal Reserve Bank of St. Louis where researchers (e.g. Andersen and Jordan, 1968; Carlson, 1976, 1978; Hafer, 1982) have extensively investigated the relative effectiveness of fiscal and monetary actions on economic activity. The pioneering work using the St. Louis equation was the study by Andersen and Jordan (1968) who investigated the relative effectiveness of fiscal and monetary actions on economic activity for the US. In this study, Andersen and Jordan regressed quarterly changes in nominal GNP on current and lagged quarterly changes in money stock and in the various measures of fiscal actions: high-employment budget surplus/deficit, high-employment expenditures, and high-employment receipts, using data from 1952 through 1968.[(22)(23)] In addition they used an *Almon lag* specification on the

[22] High-employment budget (surplus/deficit, expenditure, and receipts) measures the budget (surplus/deficit, expenditure and, receipts) at some arbitrarily defined high/ full-employment level of economic activity (i.e. at potential output) (Dornbusch, Fischer and Startz, 2001; Jacobs, Schoeman,

independent variables to incorporate the dynamic effects of time series data used in the study. Their results suggested that the overall effect of fiscal actions on GNP was relatively small and, exerted no statistically significant and lasting influence, while monetary actions caused significant and permanent effects on GNP, during the sample period.

However, the results obtained by Andersen and Jordan's (1968) study have been the focus of considerable criticism. Much of this criticism stems from the fact that their results were substantially different from the conventional view, based, in part, on the results obtained by large econometric models about the effects of fiscal actions on economic activity and the time lags these actions take to have an impact on economic growth. For example, models that have specifically quantified the effect of fiscal actions on the economy based on the Keynesian approach have suggested that fiscal actions (whether in the form of a maintained increase in expenditure or tax cut) ultimately have an impact on economic activity, with a multiplier usually estimated at about 1.5 or more. These models also suggest that this impact of fiscal actions on economic activity comes with relatively long time lags (Dornbusch and Fischer, 1994). Logically, one would not expect fiscal policy to have an immediate effect on the economy; for, it takes time to either gather taxes after changes in tax rates or to undertake public spending after announcement of changes in the budget. Based on this reasoning, it seems unlikely that the impact of

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and Heerden, 2002). Proponents of this definition of budget argue that it is this definition that provides a better measure of the impact of the budget on the economy than the actual surplus or deficit (Carlson, 1977).

[23] *See Appendix D for discussion of the specific hypothesis underlying the St. Louis Model estimated by Andersen and Jordan (1968).*

fiscal changes can be traced to particular quarters or even less to months, and so the specification of the reasonably long time lags underlying the model appears to be important. Indeed, it appears from the literature on this issue that those who accept the original St. Louis evidence regarding the relative strength of fiscal and monetary actions do not question the importance of fiscal actions; such actions do have economic impact over a certain period. However, the size of the steady-state multiplier and the lag specification used in model estimations are both questionable (Friedman, 1977; Carlson, 1978; Batten and Thornton, 1983).

The St. Louis equation has also been criticized for three other reasons related to its specification. *First*, some critics (such as Modigliani and Ando, 1976; and, Batten and Thornton, 1983) are concerned that since the equation is not derived explicitly from a structural macroeconomic model, some relevant exogenous, right-hand-side variables may be excluded, and, as a result, the equation may be misspecified. *Second*, the fiscal policy measures used in the equation have been severely criticized, because the high-employment measures of fiscal policy are not appropriate measures of fiscal policy action (De Leeuw and Kalchbrenner, 1969; Corrigan, 1970; and, Gramlich, 1971). These critics argue that failure to specify the appropriate indicators of fiscal actions may distort their exhibited relative importance. *Third*, other critics argue that the right-hand-side variables are not exogenous with respect to nominal income and so the ordinary least squares (OLS) estimate of the parameters may exhibit simultaneous equation bias (De Leeuw and Kalchbrenner, 1969; Gordon, 1971; Goldfeld and Blinder, 1972; Elliot, 1975; Carlson and Hein, 1980; and, Hafer, 1982). Finally, in another criticism of the St. Louis equation, some authors have argued that the results may be somewhat country-specific (De Haan and Zelhorst, 1988).

In response to the above criticisms of Andersen and Jordan's (1968) findings and the methodology used, there have been a number of studies which in one way or another have re-examined and challenged their findings and methodology. Many of these studies have focused on the experience of developed countries, particularly the United States. In one of these studies, Carlson (1976) applies the same methodology to investigate this issue for the US, but using monthly data, for the sample period of 1953 through 1973. This study is an attempt to examine whether the findings of the St. Louis equation continue to hold when monthly data are used in the estimation. For the purpose of comparison, Carlson (1976) employed the specification used by Andersen and Jordan (1968) – that is the study used money, narrowly defined as demand deposits plus currency held by the public, as the measure of the monetary variable, and high-employment federal budget expenditures as the measure of the fiscal variable (Carlson, 1976, pp. 14-15). Note however that, following the lack of comprehensive measure of the dollar change in nominal GNP (the dependent variable used in the original St. Louis equation) on a monthly basis, this study used personal income as a proxy for the GNP on a monthly basis.[24] The results of this study are consistent with those obtained using quarterly data by Andersen and Jordan (1968).

[24] The rationale underlying this choice was that personal income was the most comprehensive measure of aggregate economic activity that was available on a monthly basis (Carlson, 1976, p. 16).

Friedman (1977) extends Andersen and Jordan's (1968) study to cover the period from 1953 to 1976. The study regresses nominal GNP against the money stock (demand deposits plus currency held by the public) and the high-employment equivalent of federal budget expenditures measured in current prices, and all these three variables are seasonally adjusted. Two equations are estimated in this study; one using the sample period 1953-1969 and the other using sample period 1953-1976. In contrast with Andersen and Jordan's results he finds that fiscal actions yield a statistically significant and lasting impact on GNP. Hence he concludes that "even the St. Louis model now believes in fiscal policy".

However, Carlson (1978) challenges Friedman (1977), arguing that his results are biased because during part of the sample period, the error term in the equation displayed heteroscedasticity problem, thus violating one of the basic assumptions of the Ordinary Least Squares (OLS) estimation. To solve this problem, Carlson (1978) re-estimates the St. Louis equation, regressing dollar change in nominal GNP against change in money stock (M1) and change in high-employment expenditure, but using the *rates-of-change specification* rather than *arithmetic first difference form* used in Friedman's (1977) estimation of the equation.[25] For comparison purpose, Carlson (1978) follows Friedman's (1977) approach and estimate two equations. In the first equation the sample period 1953-1969 is used while in the second equation a longer sample period, 1953-1976, is used. His results diverge from Friedman's and support the original conclusion of the St. Louis equation that

[25]The rate-of-change specification was also suggested in Andersen and Jordan (1968) as the most preferable. However, they opted for the first difference form because it gave essentially the same results with that obtained using the rate-of-change form (Andersen and Jordan, 1968; Carlson, 1978, p. 17)

the overall effect of fiscal action on economic activity is relatively small and not statistically significant.

Batten and Thornton (1983; 1984) investigate the robustness of the policy conclusions of the St. Louis equation with respect to modifications of lag structure-specifications. Both studies investigate the lag length and polynomial degree specifications of the St. Louis equation to test whether its conclusions about the long-run efficacy of fiscal and monetary actions are affected by the lag structure employed or the polynomial restrictions imposed in the model estimation. This is a response to the criticism of the St. Louis technique that its conclusions may be sensitive to the polynomial distributed lag (PDL) estimation technique used (Batten and Thornton, 1983). In their study of 1983, Batten and Thornton carry out this investigation by employing the *Pagano-Hartley t-test* model selection criterion for selecting the appropriate lag length (structure) and polynomial degree of a general polynomial distributed lag model. Then, in their study of 1984, they extend their investigation to employ six alternative selection criteria; *Pagano-Hartley's t-test (PH), Mallow's Cp-statistic, Akaike's Final Prediction Error criterion (FPE), Schwarz Bayesian information criterion (SBIC), Geweke and Meese's Bayesian Estimation criterion (BEC),* and *the Standard F- test*. Using quarterly data for the US to estimate the St. Louis equation, where the growth rate specification regressing quarter-to-quarter annual rates of change in nominal GNP against quarter-to-quarter annual rates of change in money (defined as M1) and high-employment government expenditures for the period 1962 to 1982 is used, both studies provide evidence that the policy conclusions of the St. Louis equation are robust with respect to both the specification of its lag structure and the imposition of polynomial restrictions.

In another study, Batten and Hafer (1983) investigate the generality of the St. Louis approach by applying it to other countries. The study assesses the relative impact of monetary and fiscal actions on economic activity in a cross-country study involving six developed countries - Canada, France, Germany, Japan, the United Kingdom and the United States. The authors argue that the original St. Louis model typically estimated for the United States may be misspecified for it excludes some exogenous forces that affect nominal GNP. Hence the study adds an export variable on the right-hand-side of the equation to account for the relative openness of the economies studied.[26] Specifically, the study estimates the growth rate form of the modified version of the St. Louis equation representing nominal GNP, narrow money (M1), government expenditures and merchandise exports. As far as the final empirical results are concerned, the study finds that, while fiscal actions were significant only in the United Kingdom and France during the sample period, monetary actions did have a significant and lasting impact on GNP in all countries studied, thereby supporting the position of the finding of the original St. Louis equation that fiscal actions have relatively less importance in determining GNP growth as compared to monetary actions.

[26] Indeed, as Batten and Hafer (1983) argue, while the implicit assumption in the St. Louis studies on the United States that the domestic economy being analysed is relatively closed to the rest of the world may be adequately characterising the US economy, this may not be true for the countries whose exports account for the large proportion of their GNP.

The studies based on the estimation of the St. Louis equation that we have discussed so far have been confined to developed countries. For developing countries, studies based on the estimation of the St. Louis equation include a study by Hussain (1982) on the relative effectiveness of fiscal and monetary policy action on economic growth for Pakistan. Based on annual data for the period 1947 through 1970, this study estimates the St. Louis model using the Koyck lag specification on the independent variables. The study finds that fiscal policy actions are more effective than monetary policy action in influencing GNP growth. However, a later study by Saqib and Yasmin (1987) for Pakistan finds different results from Hussain's (1982) findings. This study regresses GDP on components of government expenditures and various measures of money supply (M1 and M2) both in nominal and real terms and finds that actually monetary policy actions are more effective than fiscal policy actions in Pakistan. However, Saqib and Yasmin's model is questionable, as it is based on the use of annual data without any lags, thus ignoring the lag effects of time series data on the fiscal and monetary actions used in the investigation.

In another study, Darrat (1984) applies a modified St. Louis type reduced form single equation model to test the relative importance of fiscal and monetary actions for the period 1950-1981 for five Latin American countries: Brazil, Chile, Mexico, Peru and Venezuela. This study makes the following modifications to the original St. Louis equation. *First*, it adds exports as another explanatory variable to account for the openness of the economies considered in the study. *Second*, it uses growth rates of the variables included in the empirical model, rather than arithmetic first differences. *Finally,* it applies the unconstrained ordinary least squares (rather than the Almon lag specification used in earlier studies) in model estimation. The study finds interesting results that, contrary to the results found in most of the studies based on developed economies, fiscal actions are more effective than monetary policy actions in explaining nominal GNP growth in the sample of the developing countries considered in the study.

In another study of the St. Louis model for developing countries, Upadhyaya (1991) applies a modified St. Louis model reduced form equation, adding the export variable as another independent variable in the equation, to analyse the effectiveness of fiscal and monetary policies in four south Asian developing countries - India, Nepal, Pakistan, and Sri Lanka. His results are mixed across the countries. The results show that only monetary actions are significant in explaining changes in nominal GNP in Nepal and Pakistan, while in Sri Lanka neither variable is found to be significant. In the case of India, the St. Louis equation is found to be inapplicable, as the monetary variable is not exogenous.[27] He concludes that the effectiveness of monetary and fiscal policy differs from country to country, depending upon the nature of the economy of the country in question. Based on his tests of the St. Louis equation using data set for India, Upadhyaya also concludes that the St. Louis type reduced form single equation method may not be applicable in all developing countries.

[27] This criticism is supported by Ansari (1996) and Synder and Bruce (2001) who point out that this St. Louis-type reduced-form equation makes exogeneity assumptions, which places structural causality assumptions on the model.

Another study applying St. Louis model in relation to developing countries was produced by Binue (1994) who examined empirically the relative impact of fiscal and monetary policies on economic activity in five African Countries - Ghana, Kenya, Nigeria, Sierra Leone and Tanzania – for the period 1965-1990. Similar to Upadhyaya (1991), the author employed a modified St. Louis-type reduced-form equation by including exports variable as another independent variable in the equation to capture the influence of economic openness on economic activity. The study also produced mixed results: monetary policy exerted a greater influence on nominal income than fiscal policy in three of the countries, Ghana, Kenya and Nigeria; fiscal policy influence was statistically significant in only one country, Nigeria; while in two countries, Tanzania and Sierra Leone, neither the fiscal policy not the monetary policy was statistically significant in determining nominal income. Moreover, Olaloye and Ikhide (1995) used a modified form of the basic St. Louis equation to empirically investigate the role of fiscal policy and monetary policy in improving the economy from recession in the case of Nigeria using monthly data from 1986 to 1991. Their results suggest that fiscal policy is more effective in influencing the economy during recession than monetary policy.

The above discussion has presented a review of some of the studies that have presented evidence on the impact of fiscal deficits on growth based on the estimations of St. Louis equation. However, some economists (e.g. Upadhyaya, 1991; Ansari, 1996; Synder and Bruce, 2001; Raham, 2005; Cyrus and Elias, 2014; among others) have criticised the validity of using St. Louis model on the grounds that it is a reduced form of an equation, the policy variables included in the right-hand side of the equation such as fiscal and monetary policy variables are not strictly exogenous, and that the equation suffers from specification error since it omits some relevant variables. As pointed out by Rahman (2005), these issues can render the results based on the estimation of St. Louis equation unreliable and inconsistent. Moreover, most of the studies that have presented evidence on the impact of fiscal deficits (or fiscal policy) on growth based on estimation of St. Louis model have been criticized for overlooking the properties of time series data, the direction of causality and endogeneity of variables used in these studies (Cyrus and Elias, 2014, p. 97). Note that, as Cyrus and Elias (2014) further argue, most of macroeconomic variables included in the St. Louis equation are very likely to exhibit non-stationarity behavior, and hence they must be differenced to be stationary. It follows, therefore, that regressions based on these macroeconomic variables at levels are likely to suffer from spurious regression problem especially if the estimated equations are non-cointegrating (Olaloye and Ikhide, 1995; Engle and Granger, 1987; Cyrus and Elias, 2014).

Following these criticisms and arguments on the St. Louis-type equation, other studies have opted to examine the relative effectiveness of fiscal and monetary policy in the context of modern time series econometrics that address most of the above criticisms associated with the St. Louis equation. For example, Cosewell and Bruce (2001) employ a vector autoregressive (VAR) technique instead of the St. Louis-type approach in an attempt to avoid the imposition of a potentially spurious a-priori constraint on the endogeneity of the variables considered in the system. This approach also helps to avoid a simultaneity bias, and incorporate suitable lags on each series to avoid the problem of omitted variable bias associated with the St. Louis equation(Coxwell and Bruce, 2002; Fatima and Iqbal, 2003; Rahman 2005).[28] Other studies use slightly different modern econometric modeling techniques in addressing the above problems associated with the St. Louis-type equation. For example, Ajisafe and Folorunso (2002) examine the relative effectiveness of monetary and fiscal policy in influencing economic growth in Nigeria using cointegration and error correction modeling techniques. The study uses annual data for the period 1970-1998 and estimates the error correction model (ECM) in which GDP growth is used as a measure of economic growth, narrow money supply (M1) and broad money supply (M2) are used as proxies of monetary policy, and government revenue, government expenditure and budget deficit are used as proxies of fiscal policy. The study examined the time series properties of the variables considered in the model by conducting a unit root test on each variable using Engle and Granger (1987) procedure before the formal model estimation was performed using co-integration analysis and error correction model. The final results suggest that monetary policy has a more significant impact on economic growth than fiscal policy in the case of Nigeria.

In another study using modern econometric techniques, Ali *et al.* (2008) investigates the relative effectiveness of fiscal and monetary policy on economic growth in the context of South Asian countries using autoregressive distributed lag (ARDL) model and error correction model (ECM). The study considers a sample of

[28] Several other studies such as Rahman (2005), Hassan (2006), Senbet (2011), and Cyrus & Elias (2014) use this approach to assessing the relative effectiveness of fiscal and monetary policy on influencing economic growth.

four countries (Pakistan, India, Bangladesh and Sri Lanka) and annual time series data covering the period from 1990 to 2007. Gross Domestic Product (GDP), broad money (M2) and fiscal balance variables are considered in the estimated empirical model, and the study finds that money supply variable is significant both in the short run and the long run, while fiscal balance is insignificant in both periods. The study therefore concludes that monetary policy is a more powerful tool than fiscal policy in influencing economic growth in South Asian economies.

In another recent study, Jawaid *et al*. (2010) examines the comparative effect of fiscal and monetary policy on economic growth in the case of Pakistan using annual time series data from the period 1981 to 2009. This study uses co-integration procedure to estimate a model considering three variables: GDP growth is used as a measure of economic growth, money supply is used as a proxy of monetary policy, and fiscal balance is used as a proxy of fiscal policy.[29] Results suggest that both fiscal policy and monetary policy have positive and significant effects on economic growth. However, further analysis of the results show that the coefficient for monetary policy is much greater than that for fiscal policy, suggesting that monetary policy is more effective than fiscal policy.

However, the above three studies (Ajisafe and Folorunso, 2002; Ali *et al*., 2008; and, Jawaid *et al*., 2010) fail to clearly show whether the data used on the dependent variable was nominal GDP or real GDP, hence raising questions on the validity of the results if nominal GDP rather than real GDP was used as the dependent variable.

[29] Stationarity analysis on each variable is performed using Dickey Fuller (1979) and Phillips Perron (1988) tests before checking for the existence of the long run relationship between the variables.

3.3.2 Evidence Based on Estimation of Growth Models

To address the specification bias associated with the St. Louis equation since it omits some important variables, as pointed out earlier, some studies have empirically examined the impact of fiscal deficits (or fiscal policy in broad terms) on economic growth based on the estimation of different versions of growth models that consider more variables on the right-hand side of the equation.

Turning to these studies that have presented evidence on the impact of fiscal deficits on economic growth based on the growth model estimations, the pioneering work based on this approach is associated with Eisner and Pieper (1984, 1986, 1987, 1988) who conducted a series of studies on the relationship between budget deficits and economic growth in the United States and other Organisation for Economic Cooperation and Development (OECD) countries. In their first study on this issue, Eisner and Pieper (1984) argue that inflation-corrected budget deficit or surplus (real budget deficits or surpluses) measures - and not conventional deficit measures - should be used in assessing the impact of fiscal policy on aggregate demand. Their choice of the inflation-corrected budget deficit or surplus measures is based on the argument that, as we discussed in Chapter Two (Section 2.4.2), inflation wipes out the real value of government debt, thereby nullifying any increase in the public's perception of its own real wealth, and thus it is necessary to correct budget deficits accordingly. Hence, they start their investigation by developing measures of the inflation-adjusted high-employment budget deficit/surplus, taking into account the effects of changes in interest rates and inflation on high employment budgets, for the United States over the period 1955-1984. Thereafter, they estimate a simple growth model using real GNP as the dependent variable and lagged values of inflation-corrected high-employment federal deficit/surplus. Their results strongly support the Keynesian view that fiscal deficits have a significant positive impact on economic growth.

In another study, Eisner (1986) uses both inflation-corrected and non inflation-corrected high-employment budget deficits data for the United States for the period 1955–1984 to provide evidence that it is the inflation-corrected deficits/surpluses that matter in assessing the influence of fiscal deficits on economic activity. This study estimates univariate regressions of percentage changes in real GNP on (both inflation-corrected and non inflation corrected) high-employment budget deficits/surplus and real monetary base. The results support Eisner and Pieper's (1984) findings that fiscal deficits significantly stimulate economic growth. In addition, the results suggest that using the inflation-corrected deficit measure produces better and more reliable estimates in assessing the influence of fiscal deficits (or fiscal policy) on economic activity.

In their later studies, Eisner and Pieper (1987, 1988) employ the same methodology to estimate the effect of cyclically and inflation-adjusted budget deficits on real GNP growth rates for the United States and other OECD countries. These studies also report results which are consistent with those found in the earlier studies (Eisner and Pieper, 1984; Eisner, 1886) that fiscal deficits exert a positive and significant effect on economic growth for the United States and many of the other OECD countries.

Studies by Eisner and Pieper stimulated subsequent research, much of which wanted to challenge their work. For example, in one of the subsequent studies, De Haan and Zelhorst (1988) challenge Eisner and Pieper's (1984, 1986, 1987 and 1988) studies arguing that they are plagued with some estimation problems which make their results unreliable. In particular, they argue that the evidence provided in Eisner (1986) is biased due to two major estimation problems. First, they argue that the equation estimated by Eisner lacks a longer lag structure beyond the restrictive one-year lag. Following this criticism, De Haan and Zelhorst (1988) use Akaike's (1969) final prediction error (FPE) criterion to search for the appropriate lag lengths (using a maximum of three-year lag) for both fiscal and monetary variables. Second, they argue that Eisner's regressions used incorrect fiscal and monetary policy measures. According to De Haan and Zelhorst, the correct measure of fiscal policy is the change in the level of budget deficit (and not the level of budget deficit used by Eisner), and the correct indicator of monetary policy is growth rate of base money (and not the growth rate of real base money used by Eisner). Thereafter, they re-estimate Eisner's (1986) equation with these two modifications, and in the process they obtain results which are different from Eisner's. Their results suggest that real deficits had no significant impact on economic growth in the United States during the sample period (1955-1984).

In another study, Darrat and Suliman (1992) argue that both studies by Eisner (1986) by De Haan and Zelhorst (1988) suffer from a number of misspecification problems. First, they point out that neither study tested for the stationarity of the variables used in their econometric models. Citing Stock and Watson (1989), Darrat and Suliman (1992) argue that, if some of the variables are nonstationary, the usual test statistics would not exhibit standard distributions, thus leading to misleading inferences. Second, they argue that the econometric models estimated in both studies are conceptually misspecified, since they do not consider several exogenous factors (such as rate of inflation, short-term interest rate, and long-term interest rate) that could potentially influence real GNP. Third, they argue that both studies ignored any possible feedback from the changes in real GNP to the two policy variables (that is, they fail to consider a potential endogeneity issue). According to Darrat and Suliman, movements in real GNP could induce significant policy responses since high economic growth is among the primary objectives of monetary and fiscal policy. Indeed, endogeneity of some or all of the right-hand-side variables would yield biased and inconsistent regression estimates.

To address these issues, Darrat and Suliman (1992) perform the following procedures on the US data for the period 1955-1984 before they go on to estimate a modified version of the growth model estimated in Eisner (1986) and De Haan and Zelhorst (1988). First, to avoid bias in the results due to omission of some important right-hand-side variables, several explanatory variables (inflation variable, short-term interest rates variable and long-term interest rate variable) are added to the model. Thus, five candidate variables (fiscal deficit and money supply variables used in the Eisner (1986) and De Haan and Zelhorst (1988) studies *plus* these three added variables) are assumed to be relevant in the determination of real GNP. Second, each of the variables is converted to a stationary process using the appropriate degree of differencing. Third, to allow for the possible endogeneity of all six variables considered in the model, a six-equation system is constructed and estimated. In effect, the resultant system becomes a 6×6 vector autoregressive (VAR) model. Note that, in order to test Eisner and Pieper's hypothesis that it is the inflation adjusted deficits that matter in analyzing the role of fiscal policy in influencing aggregate demand and output, Darrat and Suliman (1992) applied all these procedures on both inflation-corrected and non inflation-corrected budget deficits data.

After carrying out the above modifications and estimation of their model, Darrat and Suliman's (1992) study find the results suggesting that, regardless of whether or not deficits are corrected for inflation, federal deficits exerted a significant positive impact on real GNP in the United States during the period 1955-1984. However, their results also suggest that Eisner and Pieper's (1984, 1986) inflation-corrected deficit measure produces more reliable estimates. Thus, the results provide further evidence that the inflation-corrected deficit measures may be more useful in assessing the role of fiscal policy in influencing economic activity. In addition, as Darrat and Suliman (1992) suggested, the results produce some evidence of feedback from real GNP to budget deficits when deficits are not corrected for inflation. Thus, based on their results, Darrat and Suliman (1992) arrive at the following two conclusions. First, fiscal deficits have a positive and significant impact on economic growth. Second, the inflation-corrected deficit measures are statistically exogenous to real output changes, hence regressions considering the effect of budget deficits on output should use Eisner and Pieper's (1984, 1986) measure of inflation-corrected deficits to avoid simultaneity bias.

Following the results and conclusions given in Darrat and Suliman (1992), De Haan and Sturm (1995) also contribute to the debate by following Darrat and Suliman's (1992) approach using long-run data for the USA. However, in contrast to Darrat and Suliman's results, they find that both inflation-adjusted and non inflation adjusted budget deficits exert a negative and significant influence on real GNP growth.

In addition to the studies by Eisner and Pieper and the subsequent research that revisited their work, Karras (1994) employs a growth model framework to examine the effect of budget deficits on real output growth using pooled annual data from thirty-two countries covering the period from the 1950s to the 1980s[30]. The study finds that budget deficits are negatively correlated with the rate of growth of real output in the studied sample of countries.

Moreover, Al-Khedair (1996) investigates the impact of fiscal deficits on economic growth in the seven major industrial countries. The study covers the period from 1964 to 1993 and estimates an economic growth model that regress the economic growth variable against the explanatory variables of budget deficit, money supply,

[30] This study also considers the effects of budget deficits on other macroeconomic variables including money growth, inflation and investment.

nominal exchange rate and foreign direct investment. Results suggest that fiscal deficits have a positive and significant effect on economic growth in all the seven major industrial countries.

The empirical studies on the impact of fiscal deficits on economic growth based on a growth model approach we have reviewed so far have considered the context of developed countries. However, there also exist some empirical studies that used a growth model framework to consider this issue for developing countries. Among these is the study by Fischer (1993). In this study, Fischer uses a regression analogue of growth accounting to estimate the impact of fiscal deficits (and other economic variables) on economic growth (measured by real GDP) using a sample of thirty-two countries for the period 1961-1988. Using both cross-sectional and panel regressions, the study finds result suggesting that small budget deficits are positively associated with growth and large deficits are negatively associated with growth. The study further suggests that larger budget surpluses cause higher capital accumulation and economic growth. Fischer's results are supported by Easterly and Rebelo (1993) who also find that government budget surpluses are consistently correlated with private investment and economic growth.

In another work on developing countries**,** Nelson and Singh (1994) examine the effect of fiscal deficits on growth in a cross-section of seventy low and middle income countries. Using a modified version of a growth model of the Harrod-Domar type, Nelson and Singh estimate the effect of budget deficits on growth for two different periods, 1970-79 and 1980-89. Their model regresses real GDP growth rate against a number of explanatory variables including government budget deficits, government revenue, defense spending, domestic private and public investment, population growth rate (which is used as a proxy for the labour force), per capita income, educational attainment (which is used as a proxy for human capital), and the inflation rate. Their results suggest that fiscal deficits appeared to have consistently exercised little or no impact of any statistical significance on economic growth in developing countries during both periods (the seventies and the eighties). Based on further analysis of their results, they conclude that fiscal deficits per se may not necessarily be good or bad in the context of economic development and argue that what deficit financing is used for in the economy may be important in determining the impact of fiscal deficits on economic growth. They point out, for example, that fiscal deficits associated with public infrastructure improvements or with the promotion of private investment will most likely enhance economic growth – thus running fiscal deficits to finance government spending on activities such as these may be good for economic growth and development.

In another study, Goonewardena (1998) uses a modified version of the growth model used by Nelson and Singh (1994) to investigate the effects of budget deficits on real output growth for Sri Lanka for the sample period 1978 through 1996. In his basic model, real GDP growth is used as a dependent variable and independent variables include nominal budget deficit as a percentage GDP, private investment as a percentage of GDP, net exports as a percentage of GDP, inflation rate, and population growth rate (used as a proxy for the labour force). In the process, he estimates different versions of his basic growth model, eliminating some of the statistically insignificant variables. His results based on growth model estimation suggest that budget deficits had positive and statistically significant effects on real GDP growth in Sri Lanka during the sample period.[31]

In a more recent study, Adam and Bevan (2005) examine the non-linear effects of fiscal deficits on growth for a panel of forty-five developing countries. Their results suggest a threshold effect at a level of the deficit of around 1.5% of GDP. Hence, the authors argue that while there appears to be a growth pay-off to reducing deficits to this level, this effect disappears or reverses itself in the case of further fiscal contraction. Thus, the threshold involves not only a change of slope but also a change of sign in the relationship, indicating that for an economy not in its steady state growth path, there is a range over which deficit financing may be growth enhancing.

In another study, Fatima *et al*. (2011) investigate the impact of fiscal deficit on investment and GDP growth for the case of Pakistan using annual time series data for thirty years covering the period 1980-2009. A simultaneous equations model consisting of two equations is used to estimate the impact of fiscal deficit on investment and growth. The first equation estimates the direct effect of the fiscal deficit on economic growth. In this equation, real GDP per capita is used as a dependent variable and investment (as a share of real GDP per capita), exports (as a

[31] In this study, Goonewardena also investigates the same issue using the St. Louis equation. The equation regresses annual changes in nominal GDP on annual changes in the cyclically adjusted budget deficits and the annual changes in the monetary base for Sri Lanka using data for the period 1978-1996. The overall results from the estimations of the model also suggest that fiscal deficits affect growth positively, with a lag of 2 to 3 years.

share of real GDP per capita), imports (as a share of real GDP per capita), fiscal deficit and aid are used as the independent variables. The second equation estimates the indirect effect of fiscal deficit on economic growth through investment. This considers investment (as a share of real GDP per capita) as the dependent variable and real GDP per capita, inflation rate, real interest rate, fiscal deficit and population growth as independent variables. The estimated results suggest that fiscal deficit has a negative and significant impact on both economic growth and investment in the context of Pakistan. Following these results, the study concludes that fiscal deficit affects economic growth directly and indirectly through investment.

In a similar study for Pakistan, Fatima *et al*. (2012) estimate the economic growth effect of budget deficit in Pakistan using time series data from the period 1978 to 2009. To do this, the study measures the relationship between budget deficits and growth using a growth model regression where GDP represents the dependent variable and the independent variables include inflation, real exchange rate, real interest rate, budget deficit and gross investment. This study also finds that budget deficit has a negative and significant impact on economic growth in Pakistan. However, it should be noted that the authors fail to state clearly whether the data used for the dependent variable was nominal GDP or real GDP, hence raising a question mark on the validity of the results if nominal GDP rather than real GDP was used as the dependent variable.

To summarise the empirical evidence, it appears that the existing empirical evidence does not lead to any consensus concerning the impact of fiscal deficits on economic growth. As we have seen in the reviewed literature, the available studies report mixed results: some studies find that fiscal deficits have a positive and statistically significant effect on economic growth; others find that deficits have a negative and statistically significant impact on growth; and others even find insignificant results.

However, the assessment of the reviewed empirical studies shows two issues which are worth noting. *First*, with very few exceptions, existing empirical studies do not attempt to develop evidence bearing directly on the three theoretical perspectives concerning the impact of fiscal deficits on economic growth: Keynesian, Neoclassical and Ricardian. Thus, these studies generally provide informative estimates on the relationship between fiscal deficits and economic growth which cannot be directly linked with particular theoretical proposition. *Second*, the empirical results on the relationship between deficits and economic growth seem to be sensitive to a number a number of factors such as model and econometric specifications, measurements of the variables, nature of the studied economies and time-period. As a result, the estimates of the relationship between deficits and growth can be sensitive to all these factors, thus leading to mixed results. In consideration of these features, therefore, one should be careful to conclude on the merits of the three theoretical propositions concerning the impact of fiscal defects on economic growth solely on the grounds of empirical evidence.

3.4 Policy Implications

The literature we have reviewed raises a number of issues which have some important potential policy implications on the impact of fiscal deficits on economic growth in the context of developing countries, and therefore on our study. Some of the main potential implications are as discussed below.

First, fiscal deficits have the potential to promote economic growth in developing countries given the fact that most of these countries are characterised with large amounts of unemployed and underemployed labour and other economic resources (that is, they operate far below a full employment level). As Nelson and Singh (1994, p.183) argue, given these economic conditions, these countries are most likely to be characterised with relatively elastic long run supply curves, thus allowing fiscal expansionary policy to have a significant impact on output and growth.

Second, the impact of fiscal deficits on economic growth is likely to depend on the size of the deficits as a percentage of GDP. Small fiscal deficits may be positively associated with economic growth, while larger deficits may be negatively associated with growth (i.e. the relationship between the two is likely to be non-linear, or in other words, to have an inverted U shape).

Third, the impact of fiscal deficits on growth is also likely to depend on how the deficits are financed. As discussed earlier, for example, under the Keynesian scenario, fiscal deficits financed by monetary accommodation will most likely cause higher multiplier effects than bond-financed deficits. On the other hand, alternative ways of financing deficits can cause macroeconomic imbalances, which in turn may be detrimental to economic growth. Specifically, excessive money printing can cause high inflation; excessive foreign borrowing can cause foreign debt problems; domestic borrowing can push up domestic interest rates and thus cause crowding out problems; and excessive foreign reserve use can lead to capital flight and exchange crises. Indeed, deficit financing associated with these macroeconomic problems will most likely affect economic growth, especially in the long-run.

Fourth, even where economies are operating in the short run, in which there is a room for deficit spending policy to promote output, the impact of deficits on economic growth will depend on what deficit financing is used for. In this case, running a deficit to finance government expenditures that increase productive capacity of the economy such as expenditures on infrastructure to enhance physical capital or spending on education and health to enhance human capital will most likely have a significant impact on economic growth. On the other hand, however, deficit spending associated with operations that are not complementary to the production process or wasteful government spending will have a negative or neutral impact on economic growth.

Finally, with regard to the empirical estimation issue, it seems that empirical results can be sensitive to the issues like model and econometric specifications, and measurements of the variables used – among others. This implies that it is important to consider these issues carefully in empirical estimation in order to produce accurate and reliable results.

3.5 Conclusion

This chapter has critically examined the existing theoretical and empirical literature on the impact of fiscal deficits on economic growth. Theoretical literature has shown that there are three contending views on this issue. Some economists believe that appropriately timed and used deficits can have a significant impact of economic growth. Others believe that deficits have little or no impact on economic growth and that they merely lead to crowding out problems. Those who support this viewpoint also tend to be concerned about the potential macroeconomic consequences of the ways in which fiscal deficits are financed – that excessive money printing can cause inflation, domestic borrowing can cause crowding out problems, foreign borrowing can result in debt crises and excessive use of foreign reserves can provoke capital flight and cause exchange crises. These macroeconomic problems can indeed be detrimental to economic growth. Finally, other economists believe that deficit spending policy is a matter of indifference, that it does not have any impact on economic growth.

Following the assessment of these three main theoretical perspectives on the impact of fiscal deficits on economic growth, we argue that it is only the first two viewpoints, Keynesian and Neo-Classical, that offer the most important starting point for an analysis of the impact of fiscal deficits on economic growth, but with the two viewpoints representing two different aspects of fiscal policy; the short run and the long run, respectively. We dismiss the last theoretical perspective - the Ricardian viewpoint – on the grounds that it is based on the assumptions which are unrealistic and far from the reality. We further ague that even the Keynesian and Neo-Classical analysis mainly explains the level of output and output growth in the short-run rather than the long-run rate, while it is the endogenous growth models that provide mechanisms by which fiscal policy can affect the long-run growth rate of the economy.

In the light of these theoretical contentions on the likely effect of deficits on economic growth, we also argue that the issue is ultimately an empirical one. However, it appears that the existing empirical evidence is also mixed. Some studies find results suggesting that deficits significantly stimulate economic growth. Others find that deficits exert a negative impact on economic growth. While some find that deficits have a positive or negative but statistically insignificant impact of growth. Thus, even the existing empirical evidence does not lead to any consensus about the impact of deficits on economic growth.

Based on deduction from the reviewed literature, we argue that fiscal deficits are likely to have a significant impact on economic growth in developing countries, given the large amount of unemployed and underemployed labour and other economic resources that exist in most of these countries. However, it should be emphasised that it is not just fiscal deficits per se which matter in determining the impact of deficits on growth. Other factors – such as the size of the deficits as a percentage of GDP, the ways in which fiscal deficits are used, and what deficit financing is used for – are important too.

Chapter Four

METHODOLOGICAL FRAMEWORK

4.1 Introduction

We have seen in chapter three that existing empirical literature on the relationship between fiscal deficits and economic growth shows mixed results. Some studies find a positive and statistically significant relationship. Others find positive or negative, but statistically insignificant results. Some find a negative and statistically significant relationship. Assessment of these studies has suggested that these results have resulted from differences in methodologies, particularly in the models and econometric specifications the studies have considered.

The empirical literature also shows that two main types of empirical models have been used in estimating the relationship between deficits and growth. The first type estimates the relationship between the two using the so-called St. Louis equation and the second type uses the formulations and estimations of growth models. However, estimation of the St. Louis equation has received serious criticisms that it excludes some important explanatory variables that influence growth and suffers from a number of econometric problems. Following these criticisms of the St. Louis equation and the new developments in growth theory, many recent empirical studies that consider the growth impact of fiscal deficits have used the formulations and estimations of growth models.

However, some of the studies that use the estimations of growth models to assess the impact of deficits on growth also suffer from problems related to poor model formulation (model misspecification) and estimation. For instance, some studies fail to consider the government budget constraint (GBC)[32] in their formulations and estimations of empirical models. These problems can lead to wrong estimations of the deficit-growth relationship. Other studies suffer from econometric problems that can lead to underestimation or overestimation of the regression results. One important econometric problem has been the likely presence of endogeneity between economic growth and some of the explanatory variables.

From the above, it is clear that careful design and implementation of an appropriate methodology is important in the assessment of the impact of fiscal deficits on economic growth. This chapter, therefore, is devoted to establishing the methodological framework that this study uses to assess the impact of fiscal deficits on growth in developing countries.

The chapter is organised as follows. Following this introduction, Section 4.2 discusses the theoretical perspectives that this study considers in estimation of the impact of fiscal deficits on economic growth in developing countries. Section 4.3 presents the empirical model and the estimation strategy that this study uses in the empirical application part to test key hypotheses on the deficit-growth connection established in Chapter Three. This empirical model is based on the theoretical perspectives introduced in Section 4.2 and recent developments in growth theory.

[32] Which impose the requirement that a change in one magnitude has to be matched by offsetting changes elsewhere.

Section 4.4 discusses the data and data sources used in carrying out this study. Section 4.5 presents the econometric method chosen for this study and the reasons for choosing it. Finally, Section 4.6 concludes.

4.2 Theoretical Model

By deduction from the existing literature on the deficit-growth link, we have argued in Chapter Three that fiscal deficits are likely to have an impact on economic growth. In particular, we have established that the economic growth impact of fiscal deficits will depend on the *level of output relative to full employment output* and *the government budget constraint in the sense that the growth effect of fiscal deficits depends on composition of government expenditure within a limited government income*.[33] These are as discussed below.

Output:

We assume two distinct scenarios concerning the level of output relative to full employment output; *short run* and *long run*. In the short run, when the economy is operating at low levels of output relative to full employment output, expansionary fiscal policy will have a significant impact on output growth. On the other hand, in the long run, when the economy is near full employment (or, at full employment), expansionary fiscal policy will have very little (or, no) impact on output. These two scenarios can be derived algebraically using the IS-LM framework discussed in

[33] This theoretical model follows the theoretical model used Adam and Bevan (2005), but with some modifications.

Chapter Three as follows (Goonewardena, 1998 pp. 88-90; Elias and Mutuku, 2014 pp. 98-99):

The IS curve (or, equilibrium in the goods market) is given as:

$$y = c[y - t(y)] + i(r) + g \text{ .... (4.1)}$$

Where; y is real output, c is consumption, i is investment, g is government expenditure, t is the rate of taxation, and r is the rate of interest. Consumption depends on disposable income, and investment depends on the rate of interest.

The LM curve (or, equilibrium in the money market) is given as:

$$\bar{M}/P = k(y) + l(r) \text{ .... (4.2)}$$

Where; $\bar{M}$ is a fixed amount of nominal money supply (exogenously determined by the monetary authorities), P is the average price level, k is the transactionary and precautionary demand for money, l is the speculative demand for money, and y and r are as defined above. Transactionary and precautionary demand for money depends on income, and the speculative demand for money depends on the rate of interest.

Differentiating equation 4.1, we obtain:

$$dy = c'(dy - t'dy) + i'dr + dg = c'(1-t')dy + i'dr + dg \text{ .... } (4.3)$$

Differentiating equation 4.2, holding real money supply (M/P) constant, we obtain:

$$0 = l'dr + k'dy$$

So that, $dr = -k'/l'\, dy$ .... (4.4)

Substituting equation 4.4 into equation 4.3, we obtain:

$$dy = c'(1-t')dy - i'k'/l'\, dy + dg \text{ .... } (4.5)$$

It follows from equation 4.5, therefore, that the fiscal policy multiplier is:

$$dy/dg = \frac{1}{1 - c'(1-t') + i'k'/l'} \text{ .... } (4.6)$$

Since $c'(1-t')$ is less than 1, and $i'k'/l'$ is positive (note that; both i' and l' are negative, and k' is positive), the multiplier is positive.

In the short run (Keynesian case), when the interest rate is low, the fiscal policy multiplier is significant [in the extreme Keynesian case, $i' = 0$ (i.e. investment is interest-inelastic) and, therefore, $dy/dg = \frac{1}{1 - c'(1-t')}$, giving the full Keynesian effect].

In the long run (Neoclassical case), when the interest rate is high, the fiscal policy multiplier is very low [In the extreme Neoclassical case, $l' = 0$ (i.e. money demand is interest-inelastic) and therefore dy/dg is zero].

The above analysis ignores the price effect resulting from expansionary fiscal policy. If prices increase when aggregate demand rises due to fiscal expansion, the size of the fiscal policy multiplier will be reduced, thus reducing the net increase in output. This will be due to at least one of the following consequences of price increase:

(i) Higher prices will reduce the real value of the money stock, thus pushing equilibrium in the money market lower

(ii) Higher prices will reduce the real value of the government debt held by the private sector, thus pushing equilibrium in the goods market lower.

(iii) Higher prices will increase real tax revenue at each level of income, thus pushing equilibrium in the goods market lower.

Government budget constraint:

The government makes two types of expenditures; *productive expenditure (g_p)* and *unproductive expenditure (g_u)*. Where, as defined earlier in Chapter Three, the former represents expenditures that are complementary to the production process, raising the marginal productivity of private factors of production and thus enhancing growth, and the latter represents expenditures that, though increasing the household utility, do not directly affect production.

So that, total government expenditure (g) = $g_p + g_u$ .... (4.7)

Total government expenditure is financed using tax revenues, grants, domestic borrowing, external borrowing and monetisation (Sachs and Larrain, 1993; Adam and Bevan, 2005).

The above gives the budget constraint:

Government budget deficit = government expenditure – tax revenues + grants

Where; government budget deficit = domestic borrowing + external borrowing + monetisation.

This budget constraint provides the basis for partial analysis of the consequences of different budget components. Following Adam and Bevan (2005) and our discussion on deficit-growth link in Chapters Two and Three, we expect that:

- An increase in tax or deficit spending to finance an increase in productive expenditure is most likely growth enhancing;

- An increase in tax to finance certain types of expenditure (termed unproductive expenditure in the literature) is always growth retarding, even though this might still enhance welfare by entering individual utility functions;

- Increase in grant aid is growth enhancing if it is used to reduce taxes or increase productive spending. On the other hand, however, its growth effect is neutral if it is used to finance non-productive expenditure;

- Financing deficits by domestic borrowing is most likely growth retarding. This is due to the likely crowding out effect of private investment when the government finances expansionary fiscal policy by borrowing from the domestic private sector;

- Financing deficits by excessive foreign borrowing may lead to unsustainable levels of foreign debt, which can have detrimental effects on growth. This form of deficit financing will create serious problems especially where funds are not invested in productive activities that generate sufficiently high rates of return in foreign exchange to service foreign debt; and,

- The impact on growth of financing the budget deficit by monetisation is less straightforward. Monetisation may be inflationary, which is directly detrimental to growth.[34] However, the government can finance the deficit in this way without the cost of inflation if the increase in real output growth leads to an increase in the demand for money. If this is the case, then monetisation will most likely be growth enhancing.

To summarise, this discussion suggests that the growth impact of expansionary fiscal policy depends on the level of output relative to full employment output. In the short run, if the economy is operating at low levels of output relative to full employment output, expansionary fiscal policy will most likely have a significant impact on output growth. On the other hand, in the long run, when the economy is near full employment, expansionary fiscal policy will have very little impact on output. The discussion has also suggested that the deficit-growth connection will also depend on the government budget constraint (i.e. the composition of government expenditure and the ways fiscal deficits are financed). To examine this, the discussion has identified two types of government expenditure (i.e., productive expenditure and unproductive expenditure) and the five ways of financing it (taxes, grants, domestic borrowing, external borrowing and monetisation) and discussed the potential consequences of these different components of the government budget constraint.

[34] Monetisation will most likely be inflationary when the monetary expansion resulting from money creation is higher than the level that the private sector wishes to hold (Weiss, 1995)

4.3 Empirical Model and Estimation Strategy

Our empirical model is based on the theoretical model presented above, which is then embedded in an endogenous growth model along the lines of the model of government and growth due to Barro (1990), Sala-i-Martin (1990), and Barro and Sala-i-Martin (1992, 1995, 2004). In particular, the model takes the following general form[35]:

$$gy_{it} = \beta' X_{it} + \omega' W_{it} + u_{it} \quad \text{.......} \quad (4.8)$$

With $u_{it} = \mu_i + \lambda_t + \varepsilon_{it}$

Where;

gy is average GDP growth;

X is a vector consisting of the elements of the government budget constraint (tax revenue, non-tax revenue, grants, expenditure, and fiscal deficit);

W is a vector of control variables (consisting of the initial income, population growth rate, the level of investment, the inflation rate, the degree of openness, and the degree of financial deepening).

[35] Note that different versions of this empirical model are estimated in Chapter Six to test the key hypotheses on the impact of fiscal deficits on economic growth we established in Chapter Three. The first version examines the general relationship between fiscal deficits on economic growth. It also considers both the fiscal deficit variable and its square variable in the right hand side of the equation to test whether the relationship between fiscal deficits and economic growth is non-linear. The second version replaces the fiscal deficit variable by its sources of financing, domestic financing and foreign financing variables, to check whether the impact of fiscal deficits on growth depends on how the deficits are financed. The third version disaggregates the total government expenditure, considering both economic classification and functional classification, to examine whether the impact of fiscal deficits on economic growth depends on the composition of government expenditure.

Equation (4.8) is a standard fixed effects panel data model. Countries are indexed by i, time, defined in terms of five-year periods, by t, and u_{it} is a two-way error term with μ_i denoting time-invariant country-specific effects, λ_t common time-varying effects, ε_{it} the idiosyncratic error component, and β and ω parameters to be determined by the data.

The expected relationships between the elements of the government budget constraint and economic growth are as discussed in the theoretical model above (see section 4.2). As far as the control variables are concerned, inclusion of the initial income variable in our model follows the argument in the neo-classical growth literature that countries with lower initial income would be expected to grow faster in the transitional stages of development as they catch up (with richer countries) to the steady state growth path - the so-called “conditional convergence hypothesis” (Nelson and Singh, 1994; Sala-i-Martin, 1996; Barro and Sala-i-Martin, 2004; Roberts, 2006 – among others). Various empirical Studies such as Landau (1983), Kormendi (1985), Hopper and Marquez (1995), and Roberts (1999) provide evidence in support of this hypothesis as they find a strong negative and statistically significant effect of initial income on economic growth. On this basis, therefore, inclusion of the initial income variable in our empirical model tests the possibility that the sample of developing countries considered in this study experienced conditional convergence during the sample period.

Neo-classical growth theory also predicts that physical capital accumulation and the expansion in the labour force play the crucial role in determining economic growth

(Harrod, 1948, 1963; Domar, 1957; Mankiw, 2007). Thus, to account for these factors, we follow the standard practice in the empirical literature and include the level of investment (measured as a percentage of GDP) and population growth (a proxy for the growth of labour force) variables in our empirical model to capture the impact of capital accumulation and the expansion of the labour supply on growth, respectively. It is also worth noting that, as Nelson and Singh (1994), citing Feder (1983) points out, the population growth variable can also be used to ascertain whether there is a labour surplus situation, and if such a situation exists, whether it has a deterrent or positive effect on economic growth in developing countries.

Economic theory also suggests that macroeconomic stability is another important determinant of economic growth (Fischer, 1993; Hausman and Gavin, 1996, 2004; Agenor, 2004; Fuentes, Larraine and Schmidt-Hebbel, 2006 – among others). A variable that is commonly employed in empirical growth models to control for this is the inflation rate, i.e., the rate of change of consumer prices; for, this is generally considered as a good indicator of the quality of fiscal and monetary policy Fischer, 1993; Agenor, 2004; Fuentes, Larraine and Schmidt-Hebbel; 2006). According to the literature, low and stable inflation is seen as good for growth, while high and volatile inflation is regarded as bad for growth (Fischer, 1993; Frankel, 1998; Fuentes, Larraine and Schmidt-Hebbel; 2006). Along these lines, therefore, we include the inflation rate as a variable in our empirical model to control for macroeconomic stability.

Openness to international trade (or trade liberalisation) is another factor that has been regarded by many, in both academic and policy-making spheres, as one of the most important influences on economic growth. Theoretical literature posits a number of channels through which openness to international trade affects economic growth. One explanation for the theoretical relationship between the degree of openness to international trade and growth is in terms of comparative advantage; that is, participation in international trade leads to specialisation and economies of scale, which in turn can lead to economic growth (Andersen and Babula, 2008; David, 2007). This explanation of the openness-growth link is therefore associated with the reallocation of resources (and hence more efficient use of existing resources) within the national borders determined by exogenous differences between countries given by factor endowments. However, research on endogenous growth theory (which incorporates endogeneity of technical change) since the mid-1980s, offers another explanation of the openness-growth link that openness to international trade allows countries to import technological innovation (or helps countries to speed up technological progress), which in turn increases total factor productivity and promotes growth (Rivera-Batiz and Romer, 1991; Rossman and Helpman, 1991; Andersen and Babula, 2008).

Developments in the theoretical literature on the openness-growth link have spawned an extensive empirical literature on this issue - such as Dollar (1992) Edwards (1992, 1998), Sachs and Warner (1995), Frankel and Romer (1999), Dollar and Kraay (2003, 2004) and Winters (2004), among others - with most of these studies finding evidence in support of the theory.[36] On this basis, therefore, a number of recent empirical studies on economic growth – see for example Edwards (1992, 1998), Frankel and Romer (1999), Dollar and Kraay (2000, 2001) - have incorporated an openness variable to account for the influence of the degree of openness to international trade on economic growth. Hence, a degree of openness variable measured as a ratio of exports plus imports to GDP, which has been widely used in the literature and for which data are easily available, is included in our empirical model.[37]

Finally, a degree of financial deepening variable is included in our empirical model based on the argument in the literature that a well-developed financial system can play a significant role in promoting economic growth (World Bank, 1989; Levine and Renelt, 1992; Levine and Zervos, 1993; King and Levine, 1993; Fry, 1995; Levine, 1997, Agenor, 2004; Levine 2005 – among others). According to the endogenous growth literature, a well-developed financial system can promote economic growth permanently though a number of channels. For instance, developed financial

[36] It should be noted, however, that the important question of whether openness influences growth is far from settled in the empirical literature; for a number of the studies that find a positive and significant impact of openness on growth have been subject to an important criticism in terms of robustness of the results. In particular, the main criticism has come from Edwards (1993) and Rodriguez and Rodrick (1999, 2000) who argue that results in favour of openness might have arisen from problems related to the use of flawed indicators/measures of openness used and/or model misspecification.

[37] Note that there are various measures of the degree of openness to international trade which have been employed in the existing empirical literature. These can be classified into four broad categories: *First*, trade volume measures - also known as trade intensity measures - including X/GDP, M/GDP, or (X+M)/GDP. *Second*, direct trade policy measures including tariff rates, non-tariff barriers on imports and black market premium for the exchange rate. *Third*, trade diversion measures that basically show the difference between predicted and actual trade. These measures, therefore, estimate the overall level of trade protectionism. *Fourth*, subjective measures such as the real exchange rate distortion index suggested by Dollar (1992) and a dummy variable for openness measure suggested by Sachs and Warner (1995) – also known as the SW dummy variable – that presents a single openness measure covering all major forms of trade restrictions such as non-tariff barriers, average tariff rate, black market premium for exchange rate, and state monopoly on major exports (David, 2007; Andersen and Babula, 2008; Ulasan, 2012).

markets promote the levels of savings and investment in an economy by allowing economic agents with surplus financial resources (savers) to earn a return on their savings, and economic agents with financial deficits to borrow some funds that would otherwise be difficult to get. In doing so, the financial sector can contribute to economic growth by mobilising savings and channelling them towards productive capital investments.[38] In addition, well-developed financial markets help economic agents to minimise and diversify risks by saving their financial resources in different financial instruments. Finally, developed financial markets allow a more efficient allocation of resources across the different users (people and institutions) in the economy (Pagano, 1993; Levine, 1997, 2005; Loayza and Rancière, 2004; FitzGerald, 2006). Indeed, if this were true, then one would expect a well-developed financial system to play a key role in promoting economic growth.

Nonetheless, the empirical evidence with respect to this issue is still mixed and not as straightforward as the theoretical literature suggests. Some empirical studies (for instance, King and Levine, 1993; Levine *et al*., 2000; Beck *et al*., 2000) provide support for a positive impact of financial deepening. Some studies (such as De Gregorio and Guidotti, 1995; Demetrides and Hussein, 1996; Adic and Damar, 2006; Loayza and Rancière, 2004) find that financial deepening has a negative impact on economic growth. Yet other studies (including Rousseau and Wachtel, 2002, 2011; Deidda and Fattouh, 2002; Yilmazkuday, 2011) find that financial deepening has no significant impact on economic growth. As Panizza (2013, p. 6) points out, however,

[38] According to Agenor (2004, p. 49), for instance, financial deepening leads to improvement in financial intermediation, hence leading to a reduction in the cost of intermediation and therefore increase in the return to saving. At the same time, the increased efficiency in the process of financial intermediation leads to an expansion of investment, which stimulates the rate of economic growth.

further analysis of the empirical literature suggests that, while some of empirical studies that find a negative or insignificant impact of financial depth on economic growth do not challenge the general consensus in the theoretical literature that financial depth can promote growth, most of these studies show that the expected positive relationship between the financial sector development and growth may not hold in economies characterised with high macroeconomic instability and weak institutions.[39] It follows, therefore, that financial deepening (or financial development in general) may promote growth under certain conditions such as the existence of strong institutions and macroeconomic stability. In the light of these findings in the literature, we incorporate a financial deepening variable in our empirical model to account for the influence of financial deepening (or financial development in broad terms) on economic growth in the sample of developing countries considered in this study. To measure the degree of financial deepening in our study, we use the ratio of broad money supply (M2) to GDP, which is widely used in the literature (FitzGerald, 2006).[40] Data for this variable are also easily available as compared to data on the other indicators of financial development - which can be difficult to get.

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[39] For example, Rousseau and Wachtel (2002) and Yilmazkuday (2011) show that financial development does not have a significant impact on growth in countries with high inflation. In addition, Deidda and Fattouh (2002) find that financial development has no statistically significant impact on growth in countries with small financial sectors. Furthermore, Arestis and Demetriades (1997) and Demetriades & Law (2006) find that financial development is not likely to affect growth in countries with poor institutions. While De Gregorio and Guidotti (1995) argue that the negative impact of financial sector development on growth they find for a sample of Latin American countries during the 1970s may have been attributed to poor regulation and deposit insurance policies these countries experienced during the sample period.

[40] Several other indicators of financial development which have been used in the literature include bank credit to the private sector (as a ratio of GDP), the level of stock market activity (usually measured by the turnover rate or the ratio of traded value to GDP) and some features of the legal system (such as the level of shareholder and creditor protection (FitzGerald, 2006, p. 6).

It should be noted that we are aware of the importance of governance variable in determining growth. This is well documented in the governance-economic growth literature (see, among others, Mauro, 1995; Knack and Keefer, 1995; Clague, 1997; Knack, 2002, 2003; Feng, 2003; Kaufmann and Kraay, 2003; Glaeser *et al*., 2004; Chauvet and Collier, 2004). However, this variable has been omitted from our empirical model mainly because of the lack of data on this variable for the large part of our sample period for developing countries. Note that, as Campos and Nugent (1999) and Kaufmann *et al*. (1999) argue, governance is a multidimensional issue, thus requiring various measures for each dimension. Kaufmann *et al*. (1999), for example, measure governance using six different dimensions/indicators of governance: *government effectiveness*, *voice and accountability*, *political stability and violence*, *rule of law and quality of institutions*, *corruption,* and *quality of regulation*. Following this definition and measure of governance by Kaufman *et al*. (1999) the World Bank has developed the Worldwide Governance Indicators (WGI) database which has been used as the main source of aggregate and individual governance indicators for over 215 countries since the year 1996 (World Bank, 2014). Unfortunately, the fact that these data are only available from the mid-1990s makes it difficult to use them for our study, for using these would give us only one data point and thus dropping the number of observations in our dataset drastically. Besides, data for most of the governance indicator variables tend to be constant or change very little over time hence making it practically difficult to use when employing the Arellano and Bond (1991) GMM estimator that uses first differenced data which we are using in this study.[41]

[41] Note that this estimation method is discussed later in this chapter.

We are also aware of some major economic and global crises that occurred during our sample period and that would, therefore, have had an impact on economic growth performance on the sample of developing we are considering in this study. This impact can be captured by including time dummies in our empirical model. However, note that these dummies would be removed from our model when applying the Arellano and Bond (1991) first-differenced GMM we are using in our study. Thus, no time dummies are included in our study because of this problem.

Turning to the estimation strategy, it was hypothesised in Chapter Three that the impact of fiscal deficits on economic growth depends on the following three factors: (i) the size of deficits as a percentage of GDP (i.e., the relationship is non-linear), (ii) what deficit financing is used for (i.e., the composition of government expenditure) and, (iii) the ways in which deficits are financed. To examine these hypotheses, our empirical analysis proceeds in the following four ways. First, we investigate whether the data suggest the existence of a non-linear relationship between fiscal deficits and growth using a scatter plot of average annual GDP growth against the fiscal deficits for the sample of countries used in our study. This gives only tentative evidence on the nature of the relationship between the two variables. Second, we examine the role of the fiscal deficits on economic growth by estimating the growth regression model given in equation (4.8) above. Third, in line with equation (4.8), we replace aggregate government expenditure by disaggregated expenditures to examine whether the composition of government expenditure matters in determining the impact of fiscal deficits on growth. Finally, again in line with equation (4.8), we substitute the deficit for its financing to test whether the ways fiscal deficits are financed matters in determining the growth impact of deficits. In all these cases, we test for the existence of non-linearity in the relationships, particularly on the relationship between deficits and the average annual GDP growth.

4.4 Data and Data Sources

The International Monetary Fund's Government Finance Statistics (IMF's GFS) and the World Bank's World Development Indicators (WB's WDI) served as the major sources of data for our study[42]. The selection of these sources of data for our study was based on the fact that the cross-country macroeconomic data compiled by the IMF and the World Bank are the best set of statistical data available for economic analysis, especially for developing countries.

However, as has been well recognised, documented, and discussed in many studies that have used data from the IMF and the World Bank (Nelson and Singh, 1994: Gemmel *et al*, 2007: Benos, 2009: among others), these sources of data are not without some limitations. Some of these limitations are:

(i) Sometimes non-reporting of data and/or lack of data on some variables;

[42] Most of the data from these sources were collected from the Economic and Social Data Service (ESDS) database - a UK national data service jointly run by Manchester Information and Associated Services (MIMAS) at Manchester University and the UK Data Archive (UKDA) at Essex University, the IMF's Government Finance Statistics Yearbooks, and the World Bank's World Development Indicators electronic database.

(ii) Differences in accounting concepts and methods followed by countries in reporting data and, sometimes, reporting of data using different definitions of variables; and,

(iii) Changes in the methodology of construction and classification of variables, and therefore in the reporting of data - for instance, changes in the methodology of construction and the classification of fiscal data in the IMF's GFS in 2001 (IMF, 2001) - (*see Appendix E for summaries of these methodological changes in the construction and classification of data on fiscal variables in the IMF's GFS since 2001)*.

All these data problems affected both the sample of developing countries and the sample period we could consider in our study. Data problems in terms of non-reporting of data, lack of data on some variables and the use of narrow definitions of fiscal variables by some of the countries made it possible to get data for only a small but representative sample of thirty-one developing countries for our study (*see Appendix F for the full list of these countries*). This sample includes 9 Low Income economies, 13 Lower Middle Income economies, and 9 Upper Middle Income economies, and covers four different regions: Asia and the Pacific (9 countries), Latin America and the Caribbean (9 countries), Middle East and North Africa (5 countries), and Sub-Saharan Africa (8 countries). In terms of the sample period, changes in the methodology of construction and classification of fiscal variables in the IMF's Government Finance Statistics (our primary source of fiscal data) in 2001 and poor availability of data based on the new methodology (see *Appendix E for summaries of these methodological* *changes in the construction and classification of data on fiscal variables in the IMF's GFS and discussion of problems associated with data availability from the year 2001)* restricted the sample period we could consider in the empirical part of our study to only the period 1972-2001.[43] Despite this limitation, we believe that the policy implications drawn from the result based on this dataset will still be relevant for the period after 2001, given the general current trends in most of the variables we consider in this study.

4.5 Econometric Method

The last few decades have seen several important developments in econometric methods used in estimating dynamic growth models[44].

According to the literature, earlier empirical studies on economic growth (See, for example, Landau, 1983; Ram, 1986; Romer, 1986; Barro, 1991; and, Nelson and Singh, 1994) widely used cross-section regressions that estimated average data for two to three decades for a sample of countries. These studies estimated regressions of the following general form (Hsiao, 2003):

[43] These changes in the methodology of construction and classification of fiscal data by the IMF are discussed in detail in the Government Finance Statistics Manual 2001 (GFSM 2001). This manual is also available in the soft copy on the IMF website: http://www.imf.org/external/pubs/ft/gfs/manual/pdf/all.pdf. As mentioned in the discussion above, A*ppendix E summarises these methodological changes in the construction and classification of fiscal data by the IMF.*

[44] These developments have been well summarised and discussed by Hsiao (2003)

$$\frac{y_{i.t} - y_{i,0}}{t} = \frac{\Delta y_i}{t} = \beta_0 + \beta_1 y_{i,0} + \beta_2 ' x_i + \mu_i \text{ .... (4.9)}$$

Where; $y_{i,0}$ and $y_{i,t}$ are the natural logarithms of GDP or GDP per capita at the beginning and the end of the studied period, respectively, so that $\frac{\Delta y_i}{t}$ corresponds to the average GDP or GDP per capita growth rate over the studied period. The subscript i denotes a given country, while x corresponds to a set of explanatory variables other than the initial level of GDP or GDP per capita. Finally, μ represents an error term.

However, many recent studies on growth empirics in both developed and developing countries (See, for example, Mankiw *et al*. (1992), Levin and Renelt (1992), Fischer (1993), Adam and Bevan (2005), among others) seem to favour more the estimation of dynamic growth models using a panel data framework (Hsiao, 2003). Interest among macroeconomists to use the panel data approach has been partly generated by availability of macroeconomic data for large panels of countries (Bond *et al*., 2001; Hsiao, 2003). In addition, a panel data framework has some important advantages over cross-section regressions in studying economic growth. These advantages have been discussed in Judson and Owen (1996), Hsiao (1986, 2003), Bond *et al.* (2001), Wansbeek (2001) and Baltagi (2008) – among others. Some of these advantages are; first, the use of a panel data framework normally allows one to get a larger number of data points, more informative data and degrees of freedom in comparison to the cross-section approach. As pointed out earlier in Chapter One (see section 1.5), this is especially important in a study like ours, given the problem of data availability on a number of variables considered in our empirical model. As discussed earlier, data for many economic variables, especially fiscal variables, are not consistently available for many developing countries, thus making it difficult to get a reasonably large and good time-series or cross-sectional data set to use in the empirical analysis. Using a panel data set, however, can help to minimise this problem. Second, while cross-section studies are likely to suffer from the omitted variable bias problem, by using panel data analysis it is possible to control for it. Third, a panel data approach gives more variability and less collinearity among the explanatory variables, thus making it more likely to produce more efficient coefficient estimates. Finally, the use of panel data analysis allows one to control for the likely endogeneity of one or more explanatory variables, and measurement error, by using lags of regressors as instruments where needed (Hsiao, 1986, 2003; Bond *et al.,* 2001; Wansbeek, 2001; Baltagi, 2008 – among others).

Within the panel data framework, *ordinary least squares (OLS)* and *the fixed-effects using least squares dummy variables (LSDV)* estimation techniques have been widely used in studying economic growth. However, these estimation techniques have been criticised that they produce biased estimates when employed to estimate dynamic growth models, like ours, since in this kind of model the unobserved country-specific effects are more likely to be correlated with the lagged dependent variable, which is one of the explanatory variables (Hsiao, 1986, 2003; Kiviet, 1995; Judson and Owen, 1996 – among others).

Several alternative estimation techniques have been developed to address this problem. One of the proposed procedures to eliminate the unobserved country-specific effects involves first-differencing the model (Hsiao, 1986, 2003). To illustrate this procedure, let a growth equation - including country-specific effects - be expressed as follows (Hsiao, 2003):

$$y_{it} - y_{it-1} = (\alpha - 1)y_{it-1} + \beta' x_{i,t} + \eta_i + \mu_{i,t,} \quad \text{……………………………………} (4.10)$$

Where η_i denotes the unobserved country-specific effects while the other variables are as defined earlier.

By taking first-differences, this equation becomes;

$$y_{it} - y_{it-1} = \alpha(y_{it-1} - y_{it-2}) + \beta'(x_{i,t} - x_{i,t-1}) + (\mu_{it} - \mu_{it-1}) \quad \text{…………………} (4.11)$$

As equation 4.11 shows, the unobserved country-specific effects have been removed by first-differencing the model. However, this procedure is not without limitations. For example, given that the error term is correlated with the first-differenced lagged dependent variable through the contemporaneous terms in period $t-1$, the OLS estimates will still be biased (Hsiao, 2003).

Another proposed procedure to eliminate the unobserved country-specific effects involves the use of the so-called within group (WG) estimator. This estimator first transforms the above equation as follows (Hsiao, 2003):

$$y_{it} - \overline{y_i} = \alpha\left(y_{it-1} - \overline{y_{it,1}}\right) + \beta'\left(x_{i,t} + \overline{x_i}\right) + \left(\mu_{it} - \overline{\mu_i}\right) \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots \text{(4.12)}$$

Where; $\overline{y_i}$ is the time series means of y for country i.

This transformed equation is then estimated using the OLS method. However, as Nickel (1981) argues, since $\left(y_{it-1} - \overline{y_{it,1}}\right)$ and $\left(\mu_{it} - \mu_i\right)$ are correlated, the within group estimates will also be biased even, though N is large, when T is small (Nickel, 1981). Furthermore, according to Hsiao (1986, 2003), the within group estimate of α is likely to be biased downward, while the OLS estimate level of this coefficient is biased upward.

Besides the problem related to the unobserved country-specific effects discussed above, there is another potential problem of the likely presence of endogeneity of one or more of the explanatory variables in empirical growth studies.

Anderson and Hsiao (1982) propose an instrumental variable procedure that overcomes these problems. This method first-differences the model to eliminate the unobserved country-specific effects and the variables for which only cross-country information is available, and then employs $\Delta y_{i,t-2}$ (or simply y_{t-2}) as an instrument for $\Delta y_{i,t-1}$. Under the assumption that the error term of the differenced equation is not serially correlated, these instruments will not be correlated with $\Delta\mu_{i,t} = \mu_{i,t} - \mu_{i,t-1}$.

Furthermore, Arellano and Bond (1991) argue that it is possible to gain efficiency by including additional instruments obtained using the orthogonality conditions that exist between lagged values of the dependent variable and the disturbances $\mu_{i,t}$. They propose a general method of moments (GMM), which, like the instrumental variables method proposed by Anderson and Hsiao (1982), uses first-differences to eliminate the unobserved country-specific effects and the variables for which only cross-sectional information is available. This is expressed as follows:

$$y_{it} - y_{it-1} = \alpha(y_{it-1} - y_{it-2}) + \beta(x_{it} - x_{it-1}) + (\mu_{it} - \mu_{it-1}) \quad \text{.........................} (4.13)$$

As discussed above, the error term in this equation might be correlated with the differenced lagged dependent variable by construction, hence making the OLS estimates of α inconsistent even when the set of variables x is strictly exogenous. However, if the error term is not serially correlated, instrumenting for $\Delta y_{it-1} = y_{it-1} - y_{it-2}$ will produce consistent estimates. Hence, Arellano and Bond show that values of the dependent variable lagged two or more periods are valid instruments in the first-differentiated equation. In other words, y_{t-2}, y_{t-3},..., y_{t-T} are valid instruments for $\Delta y_{it-1} = y_{it-1} - y_{it-2}$ under the assumptions that the error term in the differentiated equation is not serially correlated - that is, $E(\mu_{it}, \mu_{is}) = 0$

for $s \neq t$ - and that $E(y_{i1}\mu_{it} = 0$ for $t \geq 2$. If there is any strict exogenous variable in the equation, $E(x_{it}v_{is}) = 0$ for all $s, t,$ then all the past, present and future values of x_{it} are valid instruments in all of the differenced equations, even if this variable is correlated with the effects. Finally, some of the explanatory variables in the equation can be predetermined in the sense that the error term in the past affects the current value of the variable, $E(x_{it}v_{is}) \neq 0$ for $s < t$, but current and future values of the error term do not affect the current value of the variable, $E(x_{it}v_{is}) = 0$ for $s \geq t$. If this is the case, the values of the predetermined variables lagged one period or more are valid instruments in the first-difference equation.

The consistency of the Arellano and Bond (1991) GMM estimators depends on whether the instruments used in the difference equations are valid or not. To fulfil this requirement, it is necessary that the error term is not serially correlated at second-order – that is, $E(\Delta v_{it}\Delta v_{it-2}) = 0$. To address this issue, Arellano and Bond (1991) suggest two specifications tests that are commonly used within the GMM framework; first, the test that evaluates the hypothesis for lack of second-order serial correlation in the differenced residuals; and, second, the Sargan test of over-identifying restrictions, which tests the overall validity of the instruments.

To provide empirical evidence to support their argument, Arellano and Bond (1991) compare the performance of the Anderson and Hsiao estimator against various GMM procedures using a Monte Carlo approach and find that the GMM estimators produce substantial efficiency gains. However, in a later study, Kiviet (1995) uses a slightly different experimental design to compare the Anderson and Hsiao estimator and various GMM estimators and finds that the Anderson and Hsiao estimator compares favourably with GMM estimators. Thus, based on these findings, Kiviet (1995) concludes that no estimator technique has been found to the most appropriate choice in all situations. This conclusion by Kiviet (1995) is supported by the findings in a later study by Judson and Owen (1996), in which it is found that the best estimation technique changes with the size of the panel.

Further developments of the GMM estimator have been made recently. For example, in an attempt to look for even more efficient GMM estimators, studies by Ahn and Schmidt (1995), Arellano and Bover (1995) and, Blundel and Bond (1998) have proposed to incorporate some additional moment conditions. However, this procedure is not recommended by Hsiao (2003) who argues that, while it is possible in theory to add additional moment conditions to improve the asymptotic efficiency of GMM, it is doubtful how much efficiency gain one can achieve by using a very large number of moment conditions in a small sample. Hsiao (2003) further argues that, if higher-moment conditions are used, the estimator can be very sensitive to outlying observations.

Judson and Owen (1999) run a Monte Carlo experiment to evaluate different estimation techniques, including the ones we have discussed above. Based on the results, they recommend using the Arellano and Bond first-differenced estimator for dynamic panel data models when T is small ($T \leq 10$), which is a feature of our dataset. In another study, Shioji (2001) favours using the Arellano and Bond first-differenced estimator for dynamic panel data models. Shioji argues that those methods that eliminate the average cross sectional variations from data, either by first-differencing (the Arellano and Bond estimator) or by using dummies (LSDV or the so-called corrected LSDV developed by Kiviet (1995)) are much more reliable than the GMM estimator proposed by Blundel and Bond (1998). In Shioji's view, when instruments are weak, the Blundel and Bond estimator, which involves equations in levels form, perhaps cannot properly handle the endogeneity problem.

Based on the discussion above, therefore, the first-differenced Arellano and Bond estimator seems to be the best estimation technique to use in our study. Hence, we use this estimator for various scenarios of model estimation in the empirical part of our study.

4.6 Conclusion

This chapter has discussed a methodological framework that our study implements in examining the impact of fiscal deficits on economic growth in developing countries. It first presented discussion of the theoretical framework that this study considers in analysing the impact of fiscal deficits on economic growth. This framework has established that the impact of fiscal deficits on economic growth depends on the level of output relative to full employment output. It also depends on the composition of government expenditure and the ways fiscal deficits are financed. This theoretical framework is then embedded in an endogenous growth model along the lines of the model of government and growth due to Barro (1990), Sala-i-Martin (1990), and Barro and Sala-i-Martin (1992, 1995, and 2004) to set up an empirical model that will be used in the empirical application (Chapter Six) to assess the impact of fiscal deficits on economic growth in developing countries. Following this the discussion has presented issues related to data and data sources considered for this study.

Furthermore, the discussion has highlighted two important econometric issues that need to be dealt with in estimations of macroeconomic panel data models. These are the presence of country-specific effects and the likely endogeneity of some of the explanatory variables in the model. Based on the analysis of how various estimation approaches address, or fail to address, these problems, it has been established in the discussion that the first-differenced Arellano and Bond (1991) GMM estimation approach provides a better tool to use in our study.

However, before proceeding to estimating the growth regression model in Chapter Six, the next chapter provides a quantitative descriptive analysis of the trends of the major variables considered in the empirical model.

Chapter Five

DESCRIPTIVE ANALYSIS OF THE TRENDS IN FISCAL DEFICITS AND ECONOMIC GROWTH IN DEVELOPING COUNTRIES

5.1 Introduction

The preceding chapter has discussed, among other things, the theoretical model explaining the relationship between fiscal deficits and economic growth. Using this theoretical model, the empirical model followed in this study to examine the relationship between fiscal deficits and economic growth in developing countries was also discussed, taking into account some of the control variables commonly used in the existing empirical literature on economic growth. Before we estimate this empirical model in Chapter Six, this chapter analyses the trends of the major variables included in the model - including fiscal deficits, economic growth and some of the control variables.

The chapter is organised as follows. Following this introductory section, section 5.2 analyses the trends in fiscal deficits. Section 5.3 analyses the trends in economic growth. Section 5.4 analyses the trends in government expenditure and its composition. Section 5.5 examines whether the trends in fiscal deficits and government expenditure suggest any relationship between these two and economic growth. Section 5.6 analyses the trends in some of the control variables that are included in our empirical model to examine the impact of fiscal deficits on economic growth in developing countries. Finally, section 5.7 concludes.

Before turning to the analysis, however, it is important to point out the following two important issues. *First*, as discussed earlier in Chapter Four, data for most of the variables included in the model, especially consolidated fiscal data, are not consistently available for many of the developing countries. Given this problem, a small but representative sample of only thirty-one developing countries is used to analyse the impact of fiscal deficits on economic growth in developing countries. Our analysis in this chapter, therefore, employs these data from the sample of thirty-one countries to analyse the trends in fiscal deficits, economic growth and other macroeconomic variables included in our empirical model. The analysis considers data for the whole sample of thirty-one countries. In addition, it considers data for the four different regions represented in the sample - Asia and the Pacific (9 countries), Latin America and the Caribbean (9 countries), Middle East and North Africa (5 countries), and Sub-Saharan Africa (8 countries) – separately in order to examine whether there are any significant regional differences in terms of the trends in the major variables included in our empirical model.

Second, our analysis in this chapter concentrates only on descriptive statistics/analysis, and does not deal with the issues related to causality and/or lags. These issues are dealt with later in Chapter Six. This decision is taken bearing in mind that the methodology that we follow in the analysis in this chapter cannot easily address these issues, and that these issues can be addressed better when performing regression analysis, which is the focus of our analysis in Chapter Six.

5.2 Trends in Fiscal Deficits

It was argued in Chapter Three that the impact of fiscal deficits on economic growth depends not only on the size of fiscal deficits, but also on how the deficits are financed. It is important therefore that, when analysing the trends of fiscal deficits in developing countries, we consider not only the trends in total fiscal deficits but also how these deficits are financed. Thus, this section analyses the trends in both total fiscal deficits and deficit financing.

5.2.1 Total Fiscal Deficits

Table 5.1 and Figure 5.1 show the trend in fiscal deficits as a percentage of GDP for the entire set of developing countries and different regions considered in this study. On average, fiscal deficits for the entire set of countries in the study increased from 4.26 percent of GDP in 1972-1976 to 5.29 percent in 1982-1986. Thereafter, the level of total fiscal deficits as a percentage of GDP decreased sharply to only 2.15 percent of GDP during 1997-2001. This reduction in the level of fiscal deficits from the mid-1980s may be explained by the macroeconomic reforms (such as tax reforms, public expenditure reduction – among others) that most of the developing countries have widely implemented since the mid-1980s.

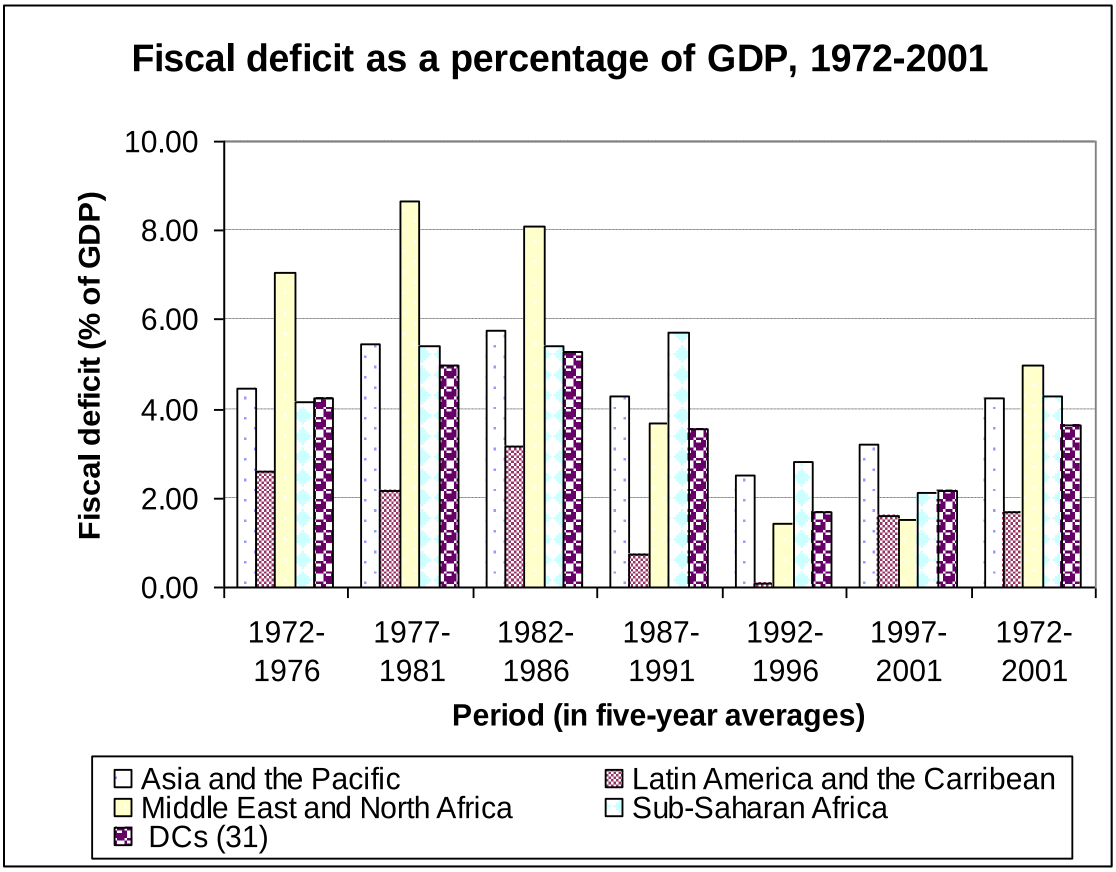
Table 5.1: Deficit as a percentage of GDP by region, 1972-2001

Region	1972-2001	1972-1976	1977-1981	1982-1986	1987-1991	1992-1996	1997-2001
Asia and the Pacific	4.26	4.47	5.44	5.74	4.29	2.50	3.18
Latin America and the Caribbean	1.70	2.60	2.14	3.17	0.75	0.10	1.58
Middle East and North Africa	4.98	7.05	8.65	8.11	3.68	1.41	1.54
Sub-Saharan Africa	4.27	4.16	5.40	5.43	5.73	2.81	2.14
All Developing Countries (31)	**3.63**	**4.26**	**4.98**	**5.29**	**3.53**	**1.67**	**2.15**

Source: Author's calculations using data from the IMF's Government Finance Statistics Yearbooks (various issues)

Similar to the whole set of countries considered in the study, on average, the level of fiscal deficits as a percentage of GDP in all four regions decreased from the mid-1980s. The highest decrease corresponds to the Middle East and North Africa region. This region reduced the level of deficit from about 8.11 percent of GDP in 1982-1986 to about 1.54 percent in 1997-2001. On the other hand, Asia and the Pacific reduced the level of deficit the least, with the deficit in this region falling from 5.74 percent of GDP in 1982-1986 to only 3.18 percent in 1997-2001. The other two regions, Latin America and the Caribbean and Sub-Saharan Africa managed to reduce their respective levels of deficit from 3.17 and 5.43 percent of GDP in 1982-1986 to 1.58 and 2.14 percent in 1997-2001.

Figure 5.1



Source: Author's calculations using data from the IMF's Government Finance Statistics Yearbooks (various issues)

5.1.2 Deficit Financing

Fiscal deficit financing varied considerably over the period 1972-2001 (see Table 5.2). For the set of developing countries as a whole, foreign financing was the main source of deficit financing during the 1970s. However, this changed from the early 1980s and domestic financing became the main source of deficit financing.

Table 5.2: Deficit financing as a percentage of total deficit by region, 1972-2001

Financing	*1972-2001*	*1972-1976*	*1977-1981*	*1982-1986*	*1987-1991*	*1992-1996*	*1997-2001*
			Asia and the Pacific				
Domestic Financing	73.77	59.53	55.57	57.92	109.04	87.96	53.89
Foreign Financing	26.23	40.47	44.43	42.08	-9.04	12.04	46.11
Total	100.00	100.00	100.00	100.00	100.00	100.00	100.00
			Latin America and the Caribbean				
Domestic Financing	-58.11	7.72	-737.01	61.57	409.29	14.49	99.37
Foreign Financing	158.11	92.28	837.01	38.43	-309.29	85.51	0.63
Total	100.00	100.00	100.00	100.00	100.00	100.00	100.00
			Middle East and North Africa				
Domestic Financing	65.68	17.56	58.17	72.75	79.09	68.08	124.20
Foreign Financing	34.32	82.44	41.83	27.25	20.91	31.92	-24.20
Total	100.00	100.00	100.00	100.00	100.00	100.00	100.00
			Sub-Saharan Africa				
Domestic Financing	-18.81	76.23	39.79	89.57	-352.41	36.20	60.78
Foreign Financing	118.81	23.77	60.21	10.43	452.41	63.80	39.22
Total	100.00	100.00	100.00	100.00	100.00	100.00	100.00
			All Developing Countries (31)				
Domestic Financing	9.38	41.06	-202.76	68.23	75.18	49.92	78.65
Foreign Financing	90.62	58.94	302.76	31.77	24.82	50.08	21.35
Total	100.00	100.00	100.00	100.00	100.00	100.00	100.00

Source: Author’s calculations using data from the IMF’s Government Finance Statistics Yearbooks (various issues)

Across the different regions, Asia and the Pacific and Middle East and North Africa regions depended largely on domestic sources of deficit financing during the entire period. Domestic financing in these regions was 73.77 percent and 65.68 percent of the total deficit, respectively, over the period 1972-2001. In contrast, the other two regions, Latin America and the Caribbean and Sub-Saharan Africa, relied heavily on foreign sources of deficit financing over the entire period. Foreign financing was 158.11 percent of the total deficit in Latin America and 118.81 percent of total deficit in sub-Saharan Africa.

5.3 Trends in Economic Growth

As Table 5.3 and Figure 5.2 below shows, average GDP growth for the set of thirty-one developing countries considered in this study remained positive for all five-year periods between 1972 and 2001.

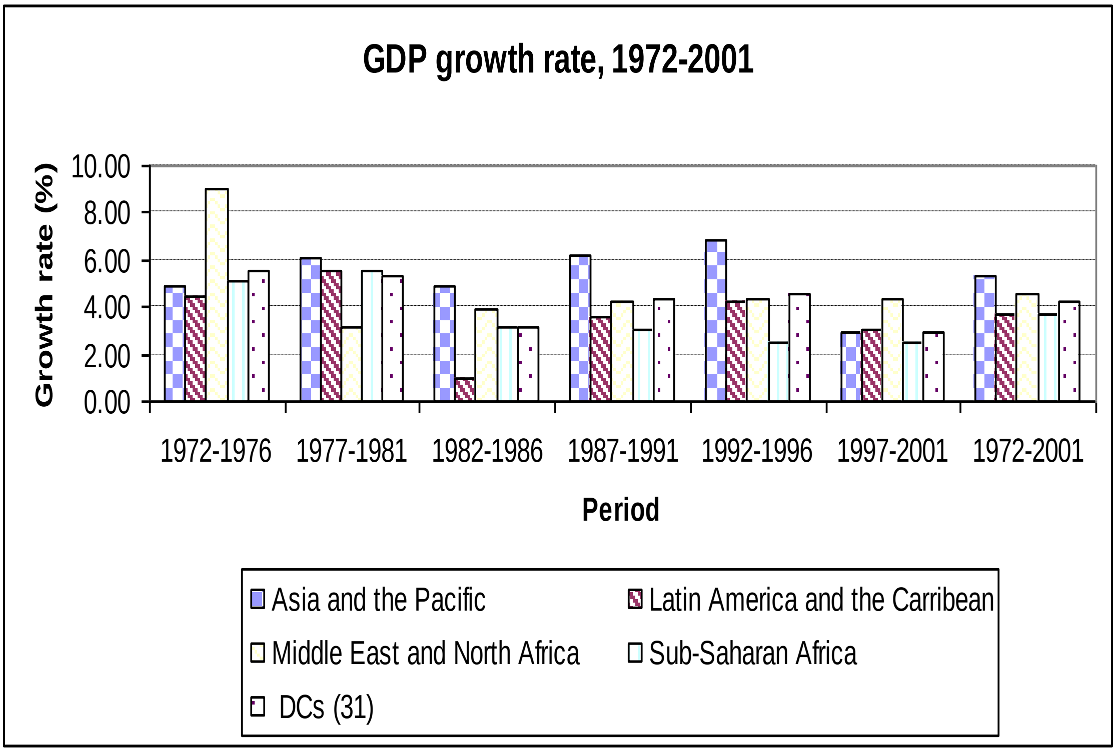
Table 5.3: GDP growth rate by region, 1972-2001

Region	**1972-2001**	**1972-1976**	**1977-1981**	**1982-1986**	**1987-1991**	**1992-1996**	**1997-2001**
Asia and the Pacific	5.30	4.85	6.10	4.90	6.23	6.81	2.93
Latin America and the Caribbean	3.66	4.49	5.56	0.97	3.62	4.26	3.04
Middle East and North Africa	4.52	9.04	3.14	3.86	4.19	4.34	4.31
Sub-Saharan Africa	3.67	5.07	5.55	3.10	3.07	2.52	2.55
All Developing Countries (31)	**4.28**	**5.51**	**5.32**	**3.13**	**4.33**	**4.56**	**2.97**

Source: Author's calculations using data from the World Bank's World Development Indicators Database

On average, the GDP growth rate for the whole set of countries in the sample was about 4.3 percent. However, as expected, average GDP growth rate varied significantly over the study period. Starting with average GDP growth rates of about 5.5 percent during the period 1972-1976 and 5.3 percent during the period 1977-1981, countries suffered a sharp decline in average GDP growth rate to only about 3.1 percent during the period 1982-1986. Average GDP growth rate then increased moderately to about 4.3 percent and 4.6 percent during the 1987-1991 and 1992-1996 respectively, before falling sharply again to about 3 percent during the period 1997-2001. It should be pointed out that lowest growth during the periods 1982-1986 and 1997-2001 is not surprising given the serious economic problems that most developing countries suffered during the early 1980s (see Weiss, 1995; Jha, 2003 – among others) and the economic consequences of the Asian financial crisis during the late 1990s (Furman and Stiglitz, 1998; Haggard, 2000; Agenor *et al*., 2000).

Figure 5.2



Source: Author's calculations using data from the World Bank's World Development Indicators Database

As one would expect, there were some differences in economic growth across the different regions. On average, Asia and the Pacific region achieved the highest average GDP growth rate, about 5.3 percent, over the entire study period. This region grew fastest in four out of six five-year periods: 1977-1981, 1982-1986, 1987-1991 and 1992-1996. The slowest growth period for this region corresponds to the period 1997-2001 when most of the economies in this region suffered from the Asian financial crisis.

On the other hand, Latin America and the Caribbean and Sub-Saharan Africa regions grew slowest on average as compared to other regions. These regions achieved average GDP growth rate of only about 3.7 percent during the entire study period as compared to the average GDP growth rate of about 4.3 percent achieved by the whole set of 31 developing countries considered in this study. On average, GDP growth rate for both of these regions has been particularly disappointing since the 1980s.

5.4 Trends in Government Expenditure and its Composition

We argued in Chapter Three that the impact of fiscal deficits on economic growth depends on the composition of government expenditure; i.e. some components of government expenditure are more likely to be growth enhancing than others. Following this argument, this study tests - among other hypotheses - a hypothesis that the impact of fiscal deficits on economic growth in developing countries depend on the composition of government expenditure in these countries. Thus, it is important that we consider the evolution/trends in both total government expenditure and its composition in examining the impact of deficit spending on economic growth in developing countries.

5.4.1: Total Government Expenditure

A number of existing studies that have analysed the evolution and trends in government expenditure for different economies with different levels of spending have standardised expenditure by considering spending as a percentage of GDP. These are for example, Easterly *et al.*, 1997; Kneller *et al.*, 1999; Adam and Bevan, 2005. Our analysis of the trends in government expenditure follows this approach.

Table 5.4 summarises the trends in government expenditure as a percentage of GDP for the whole sample of developing countries considered in this study and for the four different regions represented in this sample.

Table 5.4: Government expenditure as a percentage of GDP, 1972-2001

Region	1972-2001	1972-1976	1977-1981	1982-1986	1987-1991	1992-1996	1997-2001
Asia and the Pacific	23.50	19.03	22.22	25.52	24.09	22.63	22.93
Latin America and the Caribbean	20.22	20.06	20.64	21.43	19.21	19.40	21.04
Middle East and North Africa	33.11	37.85	39.42	35.73	28.20	29.46	27.57
Sub-Saharan Africa	26.32	21.62	25.81	25.21	29.28	26.78	28.44
All Developing Countries(31)	**24.83**	**23.22**	**25.57**	**25.92**	**24.68**	**23.87**	**24.42**

Source: Author's calculations using data from the IMF's Government Finance Statistics Yearbooks (various issues)

Total government expenditure as a percentage of GDP for the whole set of 31 developing countries considered in this study varied slightly between 23 percent and 26 percent over the study period. Average total spending as a percentage of GDP increased from about 23 percent during the period 1972-1976 to about 26 percent during the periods 1977-1981 and 1982-1986. It then decreased to about 25 percent during the period 1987-1991 and about 24 percent during the periods 1992-1996 and 1997-2001. As argued earlier, this decrease in total government expenditure (as a percentage of GDP) during the last three five-year periods may be explained by the macroeconomic adjustment programmes that most of the developing countries implemented since the mid 1980s.

Total government expenditure as a percentage of GDP also varied across different regions. In general, the Middle East and North Africa region was the highest spender in terms of total government expenditure as a percentage of GDP. On the other hand, Latin America and the Caribbean region spent the lowest in terms of total government expenditure as a percentage of GDP.

5.4.2: Composition of Government Expenditure

The previous section has analysed the trends in total government expenditure in the whole sample of developing countries considered in this study as well as in the different regions represented in the sample. However, as argued earlier, it is also necessary to take into account the composition of government expenditure in analysing the effect of deficit financed government expenditure on growth. Thus, this section analyses the composition of government expenditure for the whole set of developing countries considered in this study and for the four different regions represented in the sample. To do this we look at two classifications of government expenditure; namely, *economic classification* and *functional classification* of government expenditure.

(i) Economic Classification of Government Expenditure

Table 5.5 summarises the evolution and trends in the economic classification of government expenditure. This classifies government outlays into two types; *current expenditure* and *capital expenditure*.

Looking at the whole set of developing countries in the study, current expenditure took the highest share of government expenditure, about 78 percent, over the entire study period. The share of current expenditure also tended to increase over the study period, going up from about 76 percent during the period 1972-1976 to about 80 percent during the period 1997-2001. In contrast, capital expenditure as a share of total expenditure averaged at only around 22 percent during the study period (1972-2001), and showed a general declining trend from around 24 percent in 1972-1976 to around 20 percent in 1997-2001. These values in terms of the shares of current and capital expenditures are quite similar to those found in the studies on the composition of government expenditure in developing countries by Devarajan *et al*. (1996) and Ghosh and Gregoriou (2006).

Table 5.5: Economic classification of government expenditure: Current expenditure and capital expenditure (as percentage of total expenditure), 1972-2001

Expenditure	*1972-2001*	*1972-1976*	*1977-1981*	*1982-1986*	*1987-1991*	*1992-1996*	*1997-2001*
			Asia and the Pacific				
Current Expenditure	74.04	77.25	74.95	71.76	76.39	74.50	76.00
Capital Expenditure	25.96	22.75	25.05	28.24	23.61	25.50	24.00
Total	100.00	100.00	100.00	100.00	100.00	100.00	100.00
			Latin America and the Caribbean				
Current Expenditure	81.07	74.36	77.30	85.22	83.55	81.97	84.40
Capital Expenditure	18.93	25.64	22.70	14.78	16.45	18.03	15.60
Total	100.00	100.00	100.00	100.00	100.00	100.00	100.00
			Middle East and North Africa				
Current Expenditure	73.12	69.58	68.50	75.45	77.44	73.93	74.46
Capital Expenditure	26.88	30.42	31.50	24.55	22.56	26.07	25.54
Total	100.00	100.00	100.00	100.00	100.00	100.00	100.00
			Sub-Saharan Africa				
Current Expenditure	80.76	79.63	79.79	83.82	77.31	79.55	84.67
Capital Expenditure	19.24	20.37	20.21	16.18	22.69	20.45	15.33
Total	100.00	100.00	100.00	100.00	100.00	100.00	100.00
			All Developing Countries (31)				
Current Expenditure	77.79	75.69	75.90	79.48	78.96	77.99	80.43
Capital Expenditure	22.21	24.31	24.10	20.52	21.04	22.01	19.57
Total	100.00	100.00	100.00	100.00	100.00	100.00	100.00

Source: Author's calculations using data from the IMF's Government Finance Statistics Yearbooks (various issues)

As far as the economic classification of government expenditure across different regions is concerned, Latin America and the Caribbean and Sub-Saharan Africa regions spent the highest share of current expenditure in total government outlays, approximately 81 percent, over the study period, while Middle East and North Africa region spent the lowest, about 73 percent. The Asia and the Pacific region spend a slightly higher share of current expenditure in total government outlays than Middle East and North Africa, about 74 percent.

Similar to what happened to the whole set of countries in the study, the share of current expenditure in total government outlays increased in three of the four regions over the study period. It increased by approximately 10 percentage points in Latin America and the Caribbean, 5 percentage points in Sub-Saharan Africa, and 4 percentage points in Middle East and North Africa.

(ii) Functional Classification of Government Expenditure

Table 5.6 summarises the functional composition of government expenditure for the entire set of countries in the study and for different regions represented in the study. This classifies spending on different sectors.

For the whole set of countries in the study, economic services, education and general public services received the highest shares of total government outlays (about 23, 15 and 13 percent, respectively) over the study period. On the other hand, defence and health received the lowest shares (about 10 and 7, respectively). Interestingly, a similar composition of government expenditure to this is observed in different regions over the study period.

Another interesting observation is that spending on education and health, which is labelled in the existing literature as being growth enhancing, increased in all regions over the study period. On the other hand, spending on general public services and defence and economic services was reduced in all regions over the study period.

Table 5.6: Functional classification of government expenditure (as percentage of total expenditure), 1972-2001

Expenditure	*1972-2001*	*1972-1976*	*1977-1981*	*1982-1986*	*1987-1991*	*1992-1996*	*1997-2001*
			Asia and the Pacific				
General public services	11.60	11.60	12.77	13.10	12.32	10.38	8.21
Defence expenditure	9.69	13.23	12.20	9.37	8.76	8.91	8.26
Education expenditure	12.76	13.08	12.46	11.29	12.30	13.18	13.51
Health expenditure	5.16	4.80	4.67	4.78	4.97	5.21	5.54
Economic services	25.61	27.77	29.64	35.22	26.90	26.95	24.68
Social security and welfare	3.85	4.79	4.27	2.61	3.61	6.17	4.95
Other expenditures	31.34	24.73	23.98	23.63	31.12	29.20	34.84
Total	100.00	100.00	100.00	100.00	100.00	100.00	100.00
			Latin America and the Caribbean				
General public services	10.42	13.48	12.43	11.94	8.89	8.06	6.90
Defence expenditure	6.85	7.49	7.26	6.99	6.83	5.82	4.99
Education expenditure	16.04	16.47	15.72	14.69	14.00	16.96	17.96
Health expenditure	9.34	7.14	8.94	8.74	10.38	11.31	11.26
Economic services	18.17	24.12	22.58	17.88	15.86	14.18	11.56
Social security and welfare	20.28	20.21	18.69	21.17	19.65	22.83	23.51
Other expenditures	18.90	11.09	14.38	18.60	24.40	20.85	23.82
Total	100.00	100.00	100.00	100.00	100.00	100.00	100.00

			Middle East and North Africa				
General public services	8.30	10.84	10.27	8.67	8.11	5.41	5.79
Defence expenditure	16.35	18.34	17.84	18.81	16.12	13.49	13.07
Education expenditure	14.33	13.66	13.04	13.47	15.07	15.33	15.72
Health expenditure	4.02	3.51	3.75	3.96	4.15	4.56	4.37
Economic services	24.02	29.81	28.04	22.01	20.26	21.49	20.84
Social security and welfare	8.64	6.88	7.31	8.62	9.60	9.18	9.44
Other expenditures	24.33	16.95	19.76	24.47	26.69	30.55	30.76
Total	100.00	100.00	100.00	100.00	100.00	100.00	100.00
			Sub-Saharan Africa				
General public services	18.58	27.01	24.39	18.29	13.94	12.20	16.52
Defence expenditure	8.58	7.42	9.17	9.67	8.66	7.89	6.08
Education expenditure	17.08	17.62	16.07	16.91	16.22	17.16	19.34
Health expenditure	6.75	6.85	6.21	6.33	6.64	7.58	7.68
Economic services	20.65	23.70	23.21	20.43	22.84	14.90	12.37
Social security and welfare	5.28	5.75	5.60	5.88	3.89	4.74	7.23
Other expenditures	23.08	11.65	15.35	22.48	27.81	35.53	30.78
Total	100.00	100.00	100.00	100.00	100.00	100.00	100.00
			All Developing Countries (31)				
General public services	12.35	16.01	15.22	13.05	10.99	9.29	9.22
Defence expenditure	9.69	10.97	10.99	10.39	9.50	8.59	7.70
Education expenditure	15.09	15.37	14.47	14.12	14.26	15.64	15.39
Health expenditure	6.64	5.79	6.16	6.29	6.79	7.43	7.49
Economic services	22.71	26.01	25.58	23.71	21.55	19.58	17.80
Social security and welfare	10.34	10.20	9.65	10.94	9.77	11.99	12.05
Other expenditures	23.17	15.66	17.92	21.50	27.14	27.49	30.34
Total	100.00	100.00	100.00	100.00	100.00	100.00	100.00

Source: Author's calculations using data from the IMF's Government Finance Statistics Yearbooks (various issues)

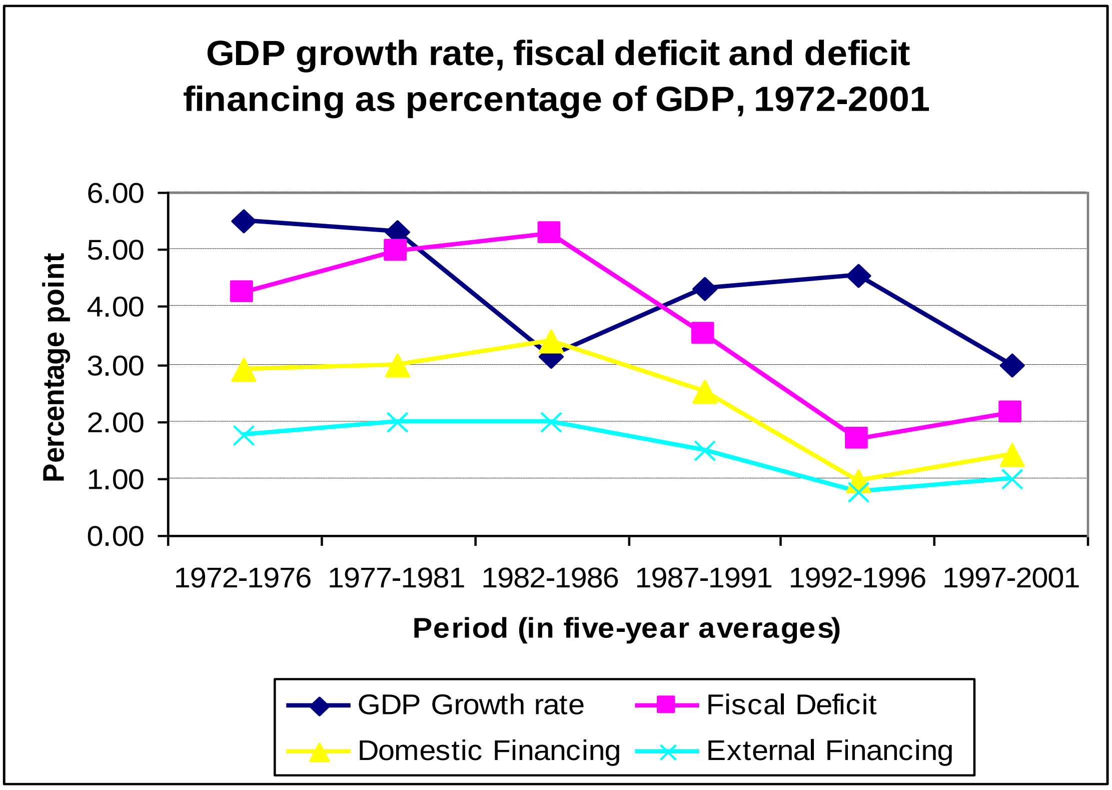
5.5 Fiscal Deficits, Government Expenditure and Economic Growth

Having examined the trends of fiscal deficits, expenditure and growth separately in the above sections, this section examines whether our data suggest any relationship between (i) fiscal deficits and economic growth, and (ii) government expenditure and economic growth.

(i) Fiscal Deficits and Economic Growth

Figure 5.3 below suggests that there was a negative relationship between fiscal deficit as a percentage of GDP and GDP growth rate during the sample period.

Figure 5.3



Source: Author's calculations using data from the World Bank's World Development Indicators and IMF's Government Finance Statistics Yearbooks (various issues)

Fiscal deficit increased from about 4.3 percentage of GDP in 1972-1976 to about 5.3 percent of GDP in 1982-1986. In contrast, GDP growth rate declined during this period from about 5.5 percent to about 3.1 percent. Fiscal deficit then declined drastically to about 1.7 percent of GDP in 1992-1996, but during this period GDP growth rate went up to about 4.6 percent. Finally, as fiscal deficits went up between 1992-1996 and 1997-2001 to about 2.2 percent of GDP, GDP growth rate went downward to about 2.3 percent during this period.

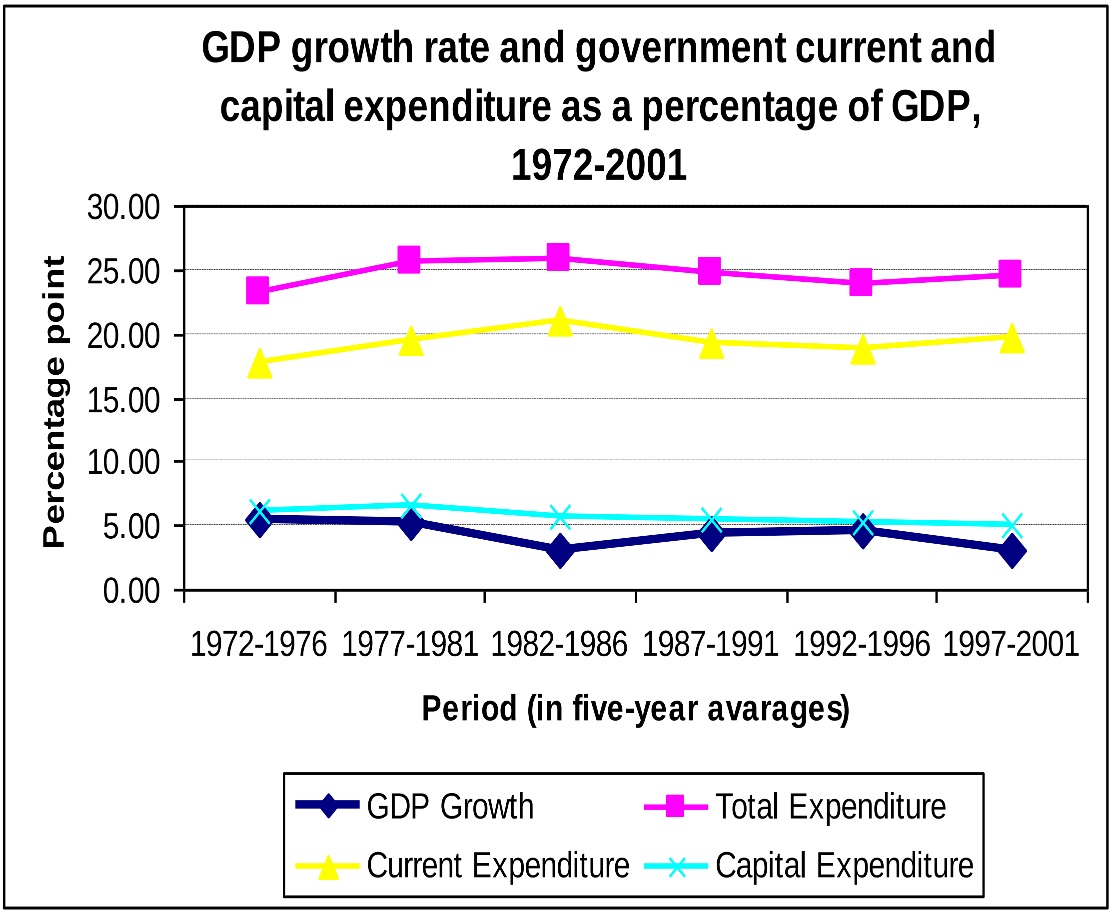
Trends in domestic financing and external financing (see Figure 5.3) show that both forms of financing were negatively related to GDP growth rate during the study period.

(ii) Government Expenditure and Economic Growth

It was shown earlier that, on average, current expenditure as a percentage of GDP in the whole set of developing countries considered in this study increased over the period 1972-2001, while capital expenditure as a percentage of GDP decreased. Current expenditure as a percentage of GDP increased from approximately 17.8 percent in 1972-1976 to about 19.7 percent 1997-2001. On the other hand, capital expenditure as a percentage of GDP decreased from about 6 percent to 5 percent during the same period.

Figure 5.4 below presents graphically these trends in current and capital expenditure, together with trends in GDP growth rates. By observing this graph, one may argue that there was a general positive relationship between capital expenditure and GDP growth rate, and a negative relationship between GDP growth rate and current expenditure, during the sample period.

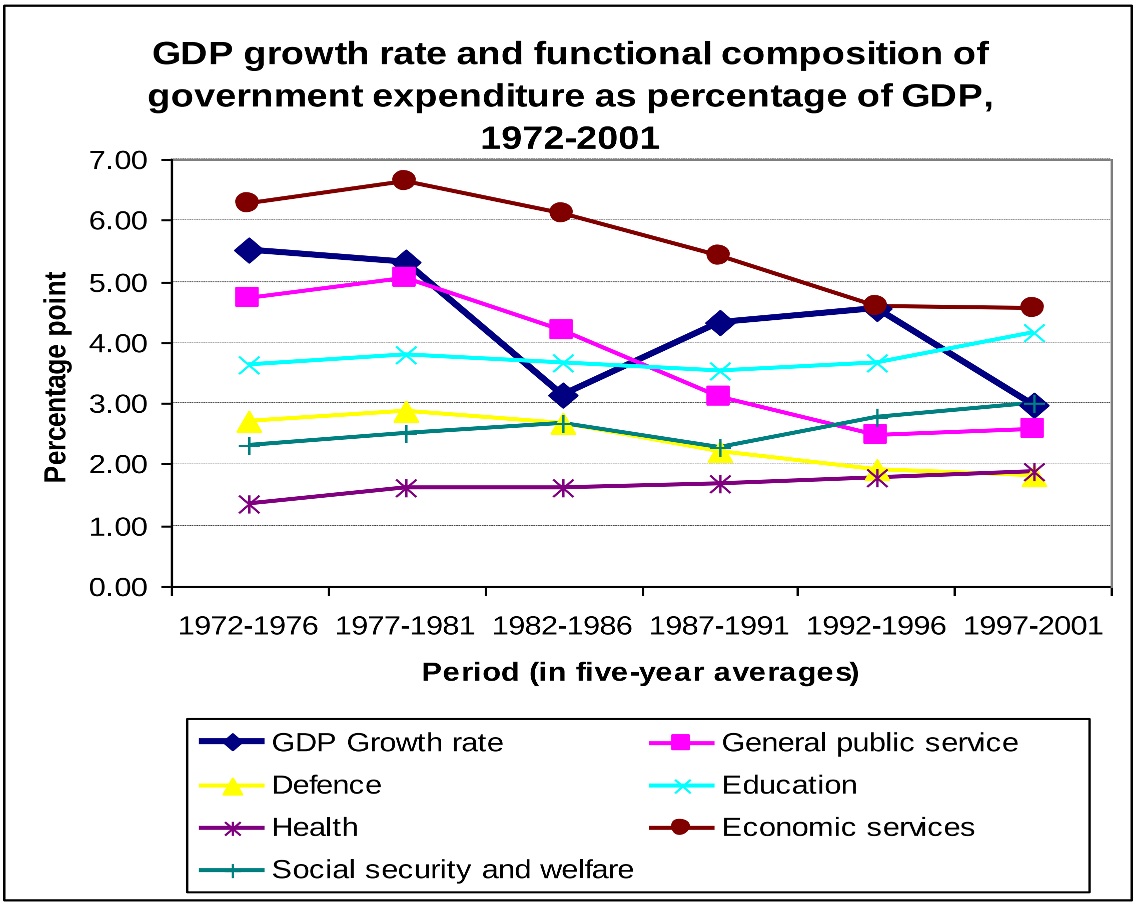
Figure 5.4



Source: Author's calculations using data from the World Bank's World Development Indicators and IMF's Government Finance Statistics Yearbooks (various issues)

With regard to the functional classification of government expenditure, a number of studies (such as Nelson and Singh, 1994; Barro, 1995; Warner, 1997 – among others) have suggested that, as argued in chapter three, spending on education, health and economic services is likely to be growth-enhancing. Looking at the correlation between spending on these sectors and economic growth (Figure 5.5), however, this does not seem to have been the case, at least in the contemporaneous period, in the set of countries included in this study. These results may not be surprising for developing countries given the high level of unemployment and underemployment of labour and other economic resources. Note also that, as discussed later in Chapter Six, some of the components of government expenditure, such as education and health expenditure are expected to affect economic growth with lags, hence making it difficult for the impact on growth of these components of government expenditure in the same five-year period (Gemmel *et al*., 2007; Benos, 2009 – among others).

Figure 5.5



Source: Author's calculations using data from the World Bank's World Development Indicators and IMF's Government Finance Statistics Yearbooks (various issues)

5.6 Trends in Control Variables

This section analyses the trends in the control variables we consider in our empirical model to estimate the impact of fiscal deficits on economic growth, as discussed in the preceding chapter. These include population growth rate, inflation rate, level of investment (as a percentage of GDP), degree of openness, and the degree of financial deepening.

Taking these in turn, population growth rate was 2.22 percent on average during the study period. By looking at the various five-year periods, it increased slightly from 2.42 percent during the first five-year period to 2.49 percent during the second five-year period, and then decreased for each of the last four five-year periods to around 1.81 percent during the period 1997-2001 (see Table 5.7 below).

Table 5.7: Trends in population growth rate (in percentage), 1972-2001

Region	1972-2001	1972-1976	1977-1981	1982-1986	1987-1991	1992-1996	1997-2001
Asia and the Pacific	2.13	2.32	2.25	2.10	2.12	2.03	1.97
Latin America and the Caribbean	2.05	2.33	2.37	2.17	1.99	1.81	1.63
Middle East and North Africa	2.42	2.56	2.78	2.91	2.44	2.13	1.69
Sub-Saharan Africa	2.40	2.55	2.74	2.68	2.41	2.09	1.93
All Developing Countries (31)	**2.22**	**2.42**	**2.49**	**2.40**	**2.21**	**2.00**	**1.81**

Source: Author's calculations using data from the World Bank's world Development Indicators Database

Across the regions, on average, Middle East and North Africa had the highest population growth rate of about 2.42 percent over the entire period, followed by Sub-Saharan Africa with 2.40 percent, Asia and the Pacific with about 2.13 percent and finally Latin America and the Caribbean with about 2.05 percent. Despite these differences, however, all the four regions experienced somewhat stable population growth rates of between 2 and 3 percent over the study period, with these rates showing a general decreasing trend over time.

The inflation rate in turn, the indicator of macroeconomic stability, was somewhat volatile and remained in the moderate double digit figures on average for a large part of the study period (Table 5.8).[45] It was around 24 percent during the period 1972-1976, and then fell significantly to around 16 and 17 percent during the periods 1977-1981 and 1982-1986, respectively, before jumping up again to around 20 percent during the period 1987-1991. Thereafter, and corresponding to the period of macroeconomic adjustment programmes in developing countries, it fell to about 18 percent during the period 1992-1996 and then to a single digit figure of approximately 8 percent during 1997-2001.

[45] Numerical definition of moderate inflation is far from standardised in the literature. Dornbusch and Fischer (1991, 1993) define moderate inflation as an inflation in the 15 – 30 percent range. Cottarelli and Szapary (1998) describe moderate inflation that is below 30 percent but well above 0 - 2 percent. Piana (2001) consider inflation as moderate when it is in the range of 5 percent to 25 - 30 percent. Hence, for the purpose of this study, we take account of all these definitions (and other definitions given in the literature) and describe moderate inflation as an inflation in the range of above 2 percent and less than 30 percent.

Table 5.8: Trends in inflation rate (in percentage), 1972-2001

Region	1972-2001	1972-1976	1977-1981	1982-1986	1987-1991	1992-1996	1997-2001
Asia and the Pacific	8.84	11.96	9.86	7.17	8.01	8.60	7.88
Latin America and the Caribbean	26.71	52.08	23.26	27.91	36.06	22.31	10.66
Middle East and North Africa	11.13	9.73	13.54	12.94	15.77	12.77	4.62
Sub-Saharan Africa	18.20	10.63	13.51	16.97	19.32	23.83	7.91
All Developing Countries (31)	**17.39**	**24.20**	**15.41**	**16.65**	**20.32**	**17.18**	**8.17**

Source: Author's calculations using data from the World Bank's world Development Indicators Database

In terms of the regional trends in inflation rates, Latin America and the Caribbean experienced the highest average rate of inflation, 26.71 percent, during the study period, followed by Sub-Saharan Africa with 18.20 percent, and Middle East and North Africa with 11.13 percent.[46] As the average inflation rate figures show in the table above, all these three regions experienced the double-digit figures of inflation which was also somewhat volatile for the large part of the study period.[47] In contrast to these three regions, however, average inflation rate in Asia and the Pacific region remained generally low in single-digit figures and stable for a significant part of the study period. On average, the rate of inflation in this region was 8.84 percent during the entire study period.

[46] Note that the high rate of inflation in Latin America and the Caribbean region could be explained by the persistent high moderate double digit inflation that a number of Latin American countries suffered during the large part of the 1980s and early 1990s (Dornbusch and Fisher, 1991, 1993; Loungani and Swagel, 2001).

[47] Dornbusch and Fisher (1991, 1993) and Loungani and Swagel (2001) report similar average inflation figures and trends for these regions during this period.

Turning to the trends in the level of investment, on average, total investment as a percentage of GDP for the whole set of developing countries considered in this study was about 22.35 percent, and remained fairly stable, over the study period (Table 5.9). It was about 20.01 percent during the first five-year period, then increased to about 23.57 percent during the second five-year period, and then fell slightly to about 22 percent during the next two five-year periods. Total investment then went up to its highest level, about 24 percent, during the period 1992-1996, after which it decreased again slightly to about 22 percent during the last five-year period.

Similar to the general trend in the average level of investment for the whole set of developing countries as discussed above, all the four regions maintained fairly constant levels of investment as a percentage of GDP of around 20 to 25 percent during a large part of the study period.

Table 5.9: Trends in the level of investment (as a percentage of GDP), 1972-2001

Region	**1972-2001**	**1972-1976**	**1977-1981**	**1982-1986**	**1987-1991**	**1992-1996**	**1997-2001**
Asia and the Pacific	24.71	17.34	22.67	25.33	25.56	28.72	24.04
Latin America and the Caribbean	19.78	19.58	23.02	18.12	18.50	20.08	19.68
Middle East and North Africa	23.42	21.89	27.39	24.89	21.59	22.72	22.40
Sub-Saharan Africa	21.93	18.98	22.83	19.40	21.47	23.46	21.79
All Developing Countries (31)	**22.35**	**20.01**	**23.57**	**21.63**	**21.82**	**23.89**	**21.93**

Source: Author's calculations using data from the World Bank's world Development Indicators Database

Regarding the study's indicator of the degree of openness, measured as exports plus imports (X+M) as a percentage GDP, as Table 5.10 below shows, it is evident that the set of countries included in the study became relatively more open over time during the study period. The average degree of openness for the whole set of countries increased significantly from about 50 percent during the period 1972-1976 to about 61 percent during the period 1977-1981. Thereafter, it went down slightly to about 58 percent during the first half of the 1980s, the period when many developing countries experienced serious macroeconomic problems such as debt crises and shortages of foreign exchange and public finances (Weiss, 1995; Jha, 2003 – among others). However, following implementation of the trade liberalisation measures and other economic reforms since the mid 1980s, the degree of openness picked up again as expected to about 64 percent during 1987-1991, and continued to increase to about 72 percent during the period 1992-1996 and about 75 percent during the period 1997-2001.

Table 5.10: Trends in the degree of openness, 1972-2001

Region	**1972-2001**	**1972-1976**	**1977-1981**	**1982-1986**	**1987-1991**	**1992-1996**	**1997-2001**
Asia and the Pacific	63.73	45.61	55.55	55.54	62.35	74.33	85.75
Latin America and the Caribbean	62.80	39.71	58.53	52.99	64.73	74.08	75.08
Middle East and North Africa	56.39	54.48	59.50	50.26	54.02	62.00	58.07
Sub-Saharan Africa	70.42	62.03	71.07	69.84	69.67	73.71	72.59
All Developing Countries (31)	**64.00**	**49.62**	**61.06**	**57.64**	**63.59**	**72.11**	**74.79**

Source: Author's calculations using data from the World Bank's world Development Indicators Database

As far as the regional trends are concerned, all the four regions appear to have experienced a general increasing trend in the degree of openness during the study period. The degree of openness increased significantly from about 46 percent and 40 percent in 1972-1977 to about 86 percent and 75 percent in 1997-2001 in Asia and the Pacific region and Latin America and the Caribbean region, respectively. What is more, these two regions started with the lowest degrees of openness and ended with the highest degrees of openness, thus reflecting the significant trade reforms that these regions pursued during the study period. With regard to the other two regions, the degree of openness increased from about 62 percent during 1972-1976 to about 73 percent during 1997-2001 in Sub-Saharan Africa, while that of Middle East and North Africa increased the least from about 54 percent to just about 58 percent during the period.

Finally, the degree of financial deepening, measured by amount of supply of broad money (M2) as a percentage of GDP, improved continuously during the study period (see Table 5.11 below). It started at about 26 percent during the period 1972-1996 and increased continuously to about 45 percent during the period 1997-2001. Despite this increase, however, it is evident from the statistics given in Table 5.11 that the overall average degree of financial deepening for the set of developing countries considered in this study remained very low during the study period. This was estimated to be only about 37 percent for the whole set of developing countries during the period 1972-2001.

Across the different regions, on average, the highest degree of financial deepening over the entire period corresponds to Middle East and North Africa, 49.46 percent on average, followed by Asia and the Pacific with 41.41 percent. On the other hand, Sub-Saharan Africa and Latin America had the lowest averages of the degree of financial deepening of about 31 and 30 percent, respectively.

Table 5.11: Trends in the degree of financial deepening, 1972-2001

Region	**1972-2001**	**1972-1976**	**1977-1981**	**1982-1986**	**1987-1991**	**1992-1996**	**1997-2001**
Asia and the Pacific	41.41	27.15	33.41	39.31	42.73	47.46	58.55
Latin America and the Caribbean	29.56	21.91	27.44	31.31	27.86	31.92	36.79
Middle East and North Africa	49.46	33.41	43.26	53.16	55.22	54.38	56.34
Sub-Saharan Africa	31.29	24.75	29.16	31.56	32.31	31.89	33.61
All Developing Countries (31)	**36.66**	**26.07**	**32.13**	**37.22**	**37.90**	**40.05**	**45.44**

Source: Author's calculations using data from the World Bank's world Development Indicators Database

5.7 Conclusion

This chapter has analysed the trends in fiscal deficits, economic growth and government expenditure for the sample of developing countries considered in this study. This chapter has also analysed the trends in control variables included in our empirical model to estimate the impact of fiscal deficits on economic growth in developing countries.

Analysis of the trends in fiscal deficits has shown that the set of developing countries included in this study as a whole had deficit spending throughout the study period. The level of deficit as a percentage of GDP increased initially until the mid-1980s and decreased thereafter as a result of economic reforms that most of the developing countries implemented since mid-1980s. Analysis has also shown that the level of deficits as a percentage of GDP, and the level of deficit reduction since the mid-1980s, varied significantly between different regions of the developing world.

In relation to economic growth, on average, countries achieved positive GDP growth over the whole period of the study. However, GDP growth rate for the whole set of countries and between the different regions varied considerably over the study period.

On government expenditure, total spending as a percentage of GDP for the whole set of countries varied slightly over the study period. Again, similar to the level of fiscal deficits and economic growth, there were differences between regions in terms of the level of total government expenditure. As far as the composition of government expenditure is concerned, in terms of economic classification of spending, current expenditure took the highest share of total expenditure as compared to capital expenditure, and this share increased over the study period. In terms of functional classification of government expenditure, the top three sectors in terms of the allocation of government expenditure were economic services, education and general public services, while defence and health received the least amount in general.

Looking at the relationship between fiscal deficits and economic growth, the trends in these two variables for the set of countries considered in this study have suggested a negative relationship.[48] In terms of the relationship between government expenditure and economic growth, it appears that there is a general positive relationship between capital expenditure and economic growth and a negative relationship between current expenditure and economic growth.

Finally, in terms of the regional differences, the trends in the variables we have considered in the analysis suggests that, though there were some differences between the regions, the differences were not very significant.

The quantitative descriptive analyses we have performed in this chapter, of course, mask some important relationships between the variables. The next chapter, in turn, performs a more formal investigation by empirically estimating the impact of fiscal deficits and other variables on economic growth using regression analysis and discussing the results.

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[48] Note that this may be unsurprising in the short-run, since it is possible that as the economy improves the deficit will fall, as the deficit is endogenous, at least in the Keynesian model (Weiss, 1995).

Chapter Six

ECONOMETRIC ANALYSIS OF THE IMPACT OF FISCAL DEFICITS ON ECONOMIC GROWTH IN DEVELOPING COUNTRIES

6.1 Introduction

Chapter Four discussed the empirical model we use in this study to estimate the impact of fiscal deficits on economic growth. This chapter estimates the model using data from a panel of thirty-one developing countries for the period 1972-2001. As pointed out earlier in Chapter Four (Section 4.3), we use different versions of this empirical model to test the key hypotheses on the impact of fiscal deficits on economic growth we established earlier in Chapter Three. The first version examines the general relationship between fiscal deficits and economic growth. The second version replaces the fiscal deficit by its sources of financing to examine whether the impact of fiscal deficits on economic growth depends on how deficits are financed. The third version disaggregates the total expenditure to examine whether the impact of fiscal deficits on economic growth depends on the composition of government expenditure. Later, we introduce regional dummies in each of the above three versions of the model to investigate whether there are any regional differences in the relationship between fiscal deficits and economic growth in developing countries.

Before we proceed with model estimation, it is important to take into consideration a number of issues that have been a cause of bias and inconsistency of the regression estimates in some of the existing empirical studies on the relationship between fiscal policy and economic growth. One of the main issues is the misspecification of the growth equation by failure to consider the implications of the government budget constraint in the regressions. The government budget constraint requires considering both sides of the government budget (revenue side and expenditure side) simultaneously in the regressions for a meaningful analysis of the effects of fiscal policy on economic growth. Studies by Helms (1985), Mofidi and Stone (1990), Kneller *et al*. (1999), Bleaney *et al*. (2001), Angelopoulos *et al*. (2007), and Romero-Avila-Strauch (2008) showed that empirical studies on fiscal policy and economic growth which do not take into account both sides of the government budget in the regressions suffer from significant bias and inconsistency in the coefficient estimates. All these studies have emphasised the need to consider both the revenue and expenditure side of the government budget simultaneously in the regressions that examine the effects of fiscal variables on economic growth. Our study pays careful attention to the implication of the government budget constraint by including the revenue side of the government budget in all of our regression equations, in addition to the expenditure side and the fiscal balance, which are the variables of interest in our study. In doing this we disaggregate revenue into tax revenue, non-tax revenue and grants.

However, as Kneller *et al*. (1999) argue, if there are n distinct government expenditure and revenue elements, then the government budget constraint will imply the following identify:

$$\sum_{j=1}^{n} M_{j,it} = 0$$

Where: $M_{j,it}$ represents the fiscal variable j relating to country i at time t.

This full identity of the government budget constraint cannot be included in regressions due to the existence of perfect collinearity between the n elements of $M_{j.it}$ arising from the identity of the government budget constraint (Kneller *et al*., 1999). Indeed, some components of the government budget constraint are likely to move simultaneously. For example, an increase in government revenue is very likely to lead to an increase in government expenditure. On this basis, therefore, different components of government expenditure are very likely to move simultaneously with government revenue. This means that including the full identity of the government budget constraint in regressions may result into perfect or high correlation between different components of the government budget constraint, which is a potential cause of the multicollinearity problem in regressions.

Based on the above discussion, at least one element of $M_{j,it}$ must be omitted from the regression equation to avoid perfect collinearity between fiscal variables (Kneller *et al*., 1999; Bleaney *et al*., 2001). Ideally, according to the theory, the variable to be omitted should be one that has a neutral or negligible effect on growth (Barro and Sala-i-Martin, 1999; Bose *et al*., 2003; Benos, 2009). Along these lines, our study follows Barro (1990); Bose *et al*. (2003) and Benos (2009) and chooses to exclude the fiscal variable non-tax revenue from the estimated regressions. This choice to omit the non-tax revenue variable is based primarily on the theoretical prediction that variation in non-distortionary revenue items is not likely to generate significant effects on growth (Barro, 1990; Kneller *et al*., 1999; Benos, 2009).

Another problem in the studies on the effects of fiscal policy on growth concerns the issue of causality between the two. It is important to recognise that causality between fiscal variables and growth may not run exclusively in one direction, i.e. not only do changes in fiscal variables affect economic growth but the reverse causality may also be a possibility (Bose *et al*., 2003; Benos, 2009). For example, when an economy enjoys high economic growth (independently of any fiscal policy changes) it is very likely that government tax revenues will also rise and the budget deficit will fall. Similarly, when an economy faces a slowdown in economic growth, the government may pursue expansionary fiscal policy (by increasing expenditure and/or reducing taxes) to stimulate growth and therefore increase the budget deficit. Failure to take into account the issue of causality between growth and fiscal variables may lead to substantial bias and inconsistency of the coefficient estimates from the regressions (Bose *et al*., 2003). To account for this problem, as discussed earlier in Chapter Four, we employ various scenarios of the GMM estimation technique developed by Arellano and Bond (1991). This technique involves first differencing and lags of the dependent and independent variables as instruments. First differencing addresses the potential two-way causality between explanatory variables and the dependent variable. In addition, by first differencing, this technique also deals with series non-stationarity and removes country-specific effects, which are a potential source of omitted variables bias (Arellano and Bond, 1991; Baldacci *et al*., 2003; Benos, 2009).

In addition, existing literature shows that fiscal policy is likely to have an effect on growth with lags. We consider this issue by following a common approach used in existing empirical studies (such as Kneller *et al*., 1999; Folster and Henrekson, 2001; Adam and Bevan, 2005; Angelopoulos *et al*., 2007; Benos, 2009) of working with five-year averages, which allows a long enough period to capture the effects of fiscal policy actions on growth.[49] However, as Gemmel *et al*. (2007) and Benos (2009) argue, the long-run effects of some components of fiscal policy, for example spending on health and education, may not be fully captured by five-year averages. Hence, we also analyse the one-period lagged effects on growth of fiscal variables (and other explanatory variables) for which theory suggests that the full effects on growth may take longer than a five-year period.

It should also be noted that, as we discussed earlier in Chapter Four, quality of data, especially data on fiscal variables, for most of the developing countries is not optimal. This is mainly due to the inconsistency in data availability and the fact that various countries report data using different conventions for the measurement of the size of the public sector and different definitions (of say revenue and expenditure), and/or some important elements of fiscal data are sometimes casually estimated, often by the use of no more than crude extrapolation (IMF GFS – various issues, Porter and Ranney, 1982; Nelson and Singh, 1994; Gemmel *et al*., 2007; Benos, 2009). All these limitations are likely to lead to unreliable results in empirical studies, like ours, in terms of the magnitudes of the coefficient estimates. Taking this into account, analysis in this study therefore focuses mainly on the direction and the significance of the results in terms of the estimated growth effects of explanatory variables considered in various model estimations.

[49] Using five-year averages also helps to eliminate some short-run cyclical simultaneity between fiscal policy variables and economic growth (Nelson and Singh, 1994; Adam and Bevan, 2005).

Following this introduction, the rest of the chapter proceeds as follows. Section 6.2 discusses some regression diagnostics we carried out before performing formal model estimation. Section 6.3 examines the impact of total fiscal deficits on economic growth. Section 6.4 examines the impact of alternative ways of deficit financing on economic growth. Section 6.5 analyses the effects of different components of government expenditure on economic growth. This considers both economic and functional classification of government expenditure. Section 6.6 is devoted to the discussion of the results on control variables. Section 6.7 examines whether there are any regional differences in relationships between fiscal deficits and economic growth. Finally, section 6.8 concludes.

6.2 Regression Diagnostics

Before proceeding to the regression analysis and discussion of the results, it is instructive to perform diagnostic checks to ensure that the data meet all necessary regression assumptions and conditions. Failure to do this may lead to misleading results. Thus, we conducted/considered a number of regression diagnostics for our data before using them in formal model estimation. These diagnostics involved the following. *First*, we checked for outliers and removed all outlying observations. *Second*, we checked for normality to ensure that data for all variables included in the model are normally distributed. As a result of this, we performed some necessary transformations of some variables. This involved mainly transforming data for some variables into natural logarithms. Descriptive statistics of data after removing outliers and performing necessary transformations are summarised in Table 6.1 below.

Table 6.1: Descriptive statistics

Variable	Observations	Mean	Standard Deviation	Minimum	Maximum
GDP growth (GDP)	184	4.29	2.76	-3.34	11.40
Population growth (POP)	186	2.22	0.696	0.19	3.82
Degree of openness (OPEN)	183	4.018	0.52	2.37	5.35
Rate of Inflation (INFL)	179	2.39	0.85	-0.59	4.57
Total investment (INV)	181	3.05	0.28	2.26	3.86
Money Supply (M2)	182	3.48	0.47	2.23	4.52
Total Fiscal Deficit (DFCT)	183	3.48	3.58	-4.40	14.32
Domestic Financing (DFIN)	172	2.42	2.94	-3.13	11.23
External Financing (EXTFIN)	172	1.42	1.88	-2.24	7.56
Total Government expenditure (GOVEXP)	181	3.13	0.37	2.09	3.91
Government Current expenditure (CURREXP)	176	2.89	0.39	1.91	3.60
Government Capital Expenditure (CAPEXP)	175	1.49	0.67	-0.29	2.88
Expenditure on Public Service (PSEXP)	164	0.84	0.75	-0.67	2.44
Defence expenditure (DEFEXP)	147	.63	.78	-1.52	2.18
Spending on Education (EDUEXP)	164	1.15	0.65	-1.40	2.16
Spending on Health (HLTHEXP)	164	0.23	.74	-1.49	1.61
Spending on Economic Services (ECONEXP)	163	1.51	0.62	-0.11	2.82
Total tax Revenue (TAX)	182	16.37	5.77	5.02	32.61
Grants (GRANTS)	139	-.976	1.98	-7.33	3.34

Source: Author's calculations based on data from World Development Indicators CD-ROM and IMF's Government Finance Statistics CD-ROM and Yearbooks (Various issues)

Note: - All figures are calculated based on five-year averages
- All the variables are in natural logarithm except GDP, GDP_{-1}, DFCT, DFIN, EXTFIN and TAX
- All the original figures on fiscal variables, investment and money supply were expressed as a percentage of GDP

Third, we checked that multicollinearity is not existent in our data. It should be noted that when there is a perfect or near perfect linear relationship between two or more explanatory variables, the estimates for a regression model cannot be uniquely calculated (Hsiao, 2003; Baltagi, 2008; Gujarati, 2009; Asterious and Hall, 2011 – among others). On this basis, therefore, we checked for multicollinearity using the correlation matrix presented in Table 6.2 below. Generally, most of the respective pairwise correlations are reasonably low to suggest that the problem of multicollinearity is not worrisome in our data. Another useful form of information we get from the correlation matrix below is that correlations between GDP growth and most of the explanatory variables are not very strong. This suggests that the relationship between GDP growth and most of the right-hand side variables in our model might not be strongly significant. In addition to correlation analysis, we estimated variance inflation factors (VIFs) in each of the regression models we performed. Results of VIFs, which are reported later in the discussion, also suggest that multicollinearity, although existent, is not a serious problem.

In addition to performing the above-discussed diagnostic tests, it is important to note that we are aware of the recent developments in the literature in relation to diagnostic testing for unit roots (nonstationarity) in panel data studies, see Maddala and Wu (1999), Phillips and Moon (2000), Choi (2001), Levin *et al*. (2002), Hsiao, 2003, Baltagi, 2008 – among others. Following these developments, some empirical studies employing panel data have attempted to test for unit roots, depending on the time series structure of the panel data and econometric methods used in these studies (Phillips and Moon, 2000; Bond *et al*., 2001).

Table 6.2: Correlation Matrix

Variables	*GDP*	*GDP_{-1}*	*POP*	*OPEN*	*INFL*	*INV*	*M2*	*DFCT*	*DFIN*	*EXTFIN*	*GOVEXP*	*CURREXP*	*CAPEXP*	*PSEXP*	*DEFEXP*	*EDUEXP*	*HLTHEXP*	*ECONEXP*	*TAXEXP*	*GRANTS*
GDP	1.00																			
GDP_{-1}	0.14	1.00																		
POP	-0.09	-0.05	1.00																	
OPEN	-0.02	-0.01	-0.30	1.00																
INFL	-0.13	-0.21	0.21	-0.21	1.00															
INV	0.47	0.33	-0.30	0.30	-0.24	1.00														
M2	0.26	0.32	-0.37	0.25	-0.50	0.41	1.00													
DFCT	-0.04	0.05	0.09	-0.10	0.08	-0.01	0.10	1.00												
DFIN	0.02	0.08	0.07	-0.22	-0.05	-0.10	0.31	0.81	1.00											
EXTFIN	-0.13	0.01	-0.00	0.13	0.23	0.25	-0.25	0.47	0.04	1.00										
GOVEXP	-0.10	-0.08	-0.11	0.50	-0.05	0.18	0.34	0.45	0.32	0.42	1.00									
CURREXP	-0.14	-0.16	-0.03	0.42	-0.09	0.02	0.33	0.42	0.36	0.30	0.92	1.00								
CAPEXP	0.13	0.18	-0.22	0.39	0.05	0.55	0.23	0.27	0.01	0.55	0.58	0.28	1.00							
PSEXP	-0.10	-0.22	0.09	0.45	0.05	-0.02	-0.26	0.15	-0.16	0.44	0.52	0.49	0.25	1.00						
DEFEXP	0.08	0.07	0.27	-0.26	0.02	0.06	0.05	0.38	0.38	0.21	0.33	0.35	0.11	-0.05	1.00					
EDUEXP	-0.18	-0.07	0.05	0.72	-0.06	0.07	0.16	0.05	-0.09	0.22	0.70	0.68	0.38	0.49	0.10	1.00				
HLTHEXP	-0.29	-0.26	-0.12	0.75	-0.04	0.03	0.04	0.05	-0.15	0.29	0.62	0.60	0.31	0.53	-0.14	0.83	1.00			
ECONEXP	0.05	0.10	-0.04	0.35	-0.18	0.46	0.15	0.33	0.14	0.51	0.65	0.46	0.72	0.40	0.21	0.42	0.43	1.00		
TAX	-0.03	-0.09	-0.17	0.56	0.01	0.20	0.27	0.22	0.06	0.40	0.85	0.81	0.49	0.53	0.18	0.75	0.71	0.53	1.00	
GRANTS	-0.02	-0.25	-0.21	0.25	0.13	0.03	-0.02	0.19	0.10	0.24	0.52	0.51	0.24	0.29	0.15	0.31	0.32	0.35	0.40	1.00

Source: Author's calculations based on data from World Development Indicators CD-ROM and IMF's Government Finance Statistics CD-ROM and Yearbooks (Various issues)
Note: All the variables are in natural logarithm expect GDP, GDP_{-1}, DFCT, DFIN, EXTFIN and TAX

In relation to our study, note that the use of five-year average data and Arellano and Bond (1991) GMM estimator that first-differences the data, helps to deal with any potential problems of nonstationarity in the data. Besides, as Baltagi (2008) argues, using panel data can help to avoid the problem of spurious regression, which can be caused by nonstationarity, among other factors. In the words of Baltagi (2008):

> "*Unlike the single time-series spurious regression literature, the panel data spurious regression estimates give a consistent estimate of the true value of the parameter as both N and T tend to ∞. This is because the panel estimator averages across individuals and the information in the independent cross-section data in panel leads to a stronger overall signal than the pure time-series case*" (Baltagi, 2008: pp. 273-274).

According to Baltagi (2008), therefore, one does not need to worry about nonstationarity of the variables in a panel-data setting, as the regression estimates will give consistent results. Phillips and Moon (2000) seem to support Baltagi (2008) by showing that in a panel-data analysis the regression stops being spurious and consistently estimates what is actually there – i.e., if there is a relation, it will estimate the relation, and on the other hand, if there is no relation, it will estimate zero.

On the basis of the above discussion, therefore, we argue that the use of five-year average data, the first-differenced Arellano and Bond estimator, and dynamic panel data, all helps to deal with any potential problems of nonstationarity of variables, and the problem of spurious regression.

Having examined our data using the regression diagnostics discussed above, we were satisfied that our data meet all necessary regressions assumptions. Thus, we moved on to perform formal model estimation and discussion of the results as presented in the following sections. Note also that other important diagnostic testing such as tests for autocorrelation are performed as we carry out these formal model estimations.

6.3 Fiscal Deficits and Economic Growth

Existing literature on the link between fiscal deficits and economic growth was discussed in Chapter Three. Based on the critical analysis of this literature, we hypothesised that fiscal deficits are likely to have an impact (positive or negative) on growth, and that this impact depends on the following three factors: (i) the size of fiscal deficits as a percentage of GDP; (ii) the ways in which deficits are financed; and, (iii) the composition of government expenditure. This section examines whether fiscal deficits have any significant impact on economic growth in developing countries. It also examines whether the relationship between fiscal deficits and economic growth depends on the size of fiscal deficits as a percentage of GDP – that is, whether the relationship between the two is non-linear.

To do this, we estimate our empirical model given in the regression equation (4.8) taking into account the implication of the government budget constraint and all other issues that studies on fiscal policy and economic growth are likely to suffer from as discussed in section 6.1 above. Recall our earlier discussion on the implication of the government budget constraint (see section 6.1) that to determine the effect of the fiscal balance, or government expenditure or revenue on economic growth, all three of these components of the government budget constraint should be included simultaneously in a regression equation to be estimated. However, as argued earlier, these components are likely to move at the same time. As a result, high correlations between different components of expenditure, revenue and fiscal balance might occur when all of these components of the government budget constraint are considered simultaneously, thus leading to a multicollinearity problem in the estimated model. In order to avoid this problem, as mentioned earlier, we follow the spirit of Barro (1990), Kneller *et al*. (1999), Bose *et al*. (2003) and Benos (2009) and exclude non-tax revenue from the government budget constraint. These authors argue that the impact of changes in non-tax revenue on economic growth is expected to be neutral on the basis of theoretical prediction that economic growth is likely to be invariant to changes in non-distortionary revenue items.

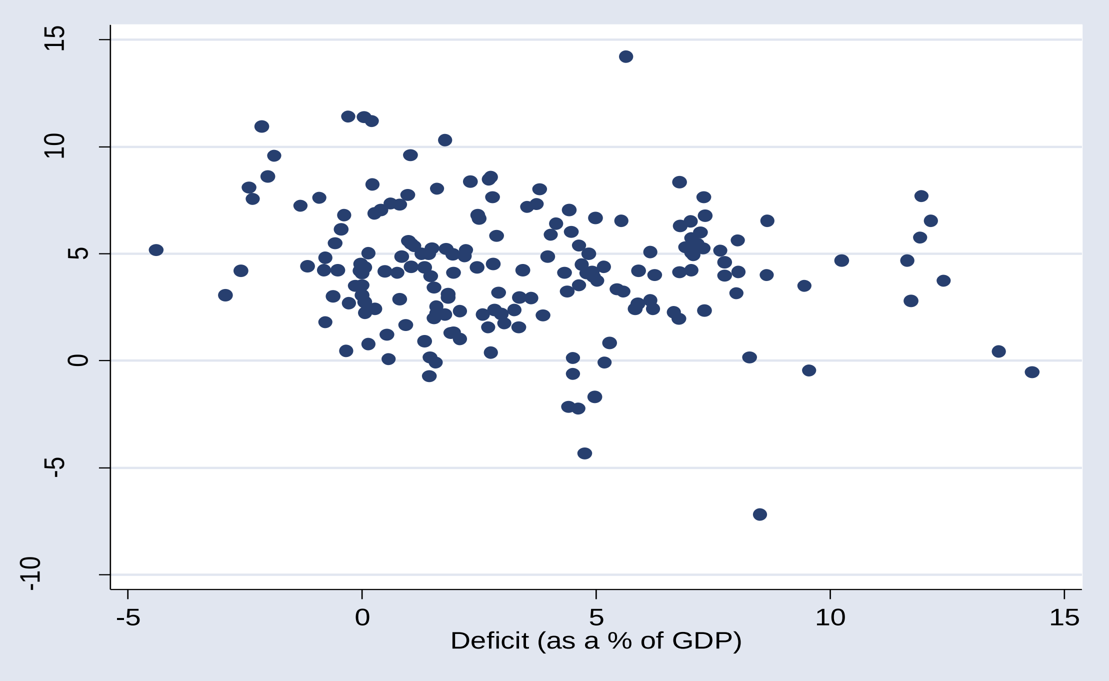
In addition, to ensure that our empirical results does not suffer from the multicollinearity problem we conducted a correlation analysis (as discussed earlier in section 6.2) to examine how strongly the explanatory variables included in the model are related to each other. Using the correlation matrix presented in Table 6.2 above, we checked for multicollinearity using correlation analysis. This analysis suggested that multicollinearity is not severe in our model, since most respective pairwise correlations are reasonably low. In addition to examining pairwise correlations between the explanatory variables, we estimated the variance inflation factors (VIFs) to check for multicollinearity based on the simple ordinary least square (OLS) estimation of our model. Based on the rule of thumb of critical value of VIF of 10 or tolerance value – defined as 1/VIF – of lower than 0.1 (Gujarati, 1995, 2009; O'Brien, 2007), the estimated VIFs (see calculated VIFs below) also suggested that multicollinearity, though present, was not severe in our model.

Variation Inflation Factors

Variable	*VIF*	*1/VIF*
GOVEXP	4.66	0.214523
TAX	2.92	0.342092
OPEN	1.97	0.508844
GRANTS	1.81	0.554007
M2	1.67	0.599337
INV	1.63	0.612293
DFCT	1.58	0.632647
INFL	1.46	0.683882
GDP_{-1}	1.35	0.743167
POP	1.30	0.766502
Mean VIF	2.03	

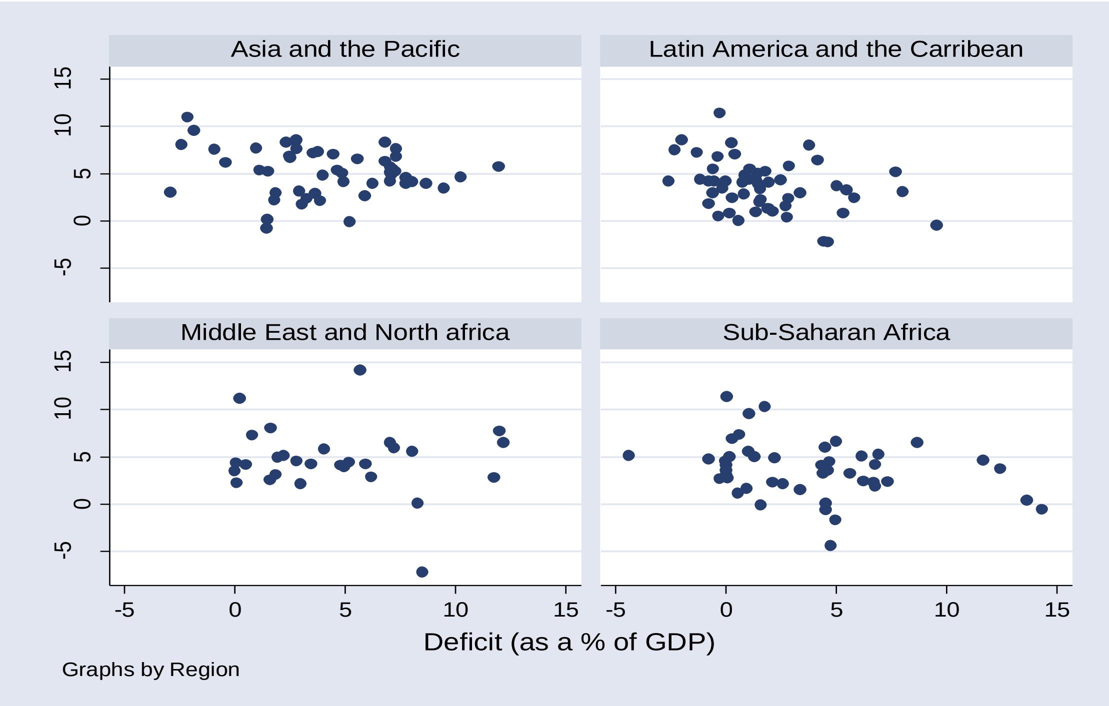
Before we proceed with formal model estimation, we follow a common approach in econometric analysis of considering an informal test based on the analysis of a simple scatter plot of our data. Figures 6.1 and 6.2 below present scatter plots of GDP growth against fiscal deficits (as a percentage of GDP) for the whole sample of thirty-one developing countries considered in this study and for four different regions (Asia and the Pacific, Latin America and the Caribbean, Middle East and North Africa, and Sub-Saharan Africa) respectively, for the period 1972-2001.

Figure 6.1: Fiscal deficits and economic growth in developing countries during the period 1972-2001



Source: Author's calculations based on data from World Development Indicators CD-ROM and IMF's Government Finance Statistics CD-ROM and Yearbooks (Various issues

Figure 6.2: Fiscal deficits and economic growth in different regions of the developing world during the period 1972-2001



Source: Author's calculations based on data from World Development Indicators CD-ROM and IMF's Government Finance Statistics CD-ROM and Yearbooks (Various issues

Analysis of these scatter plots suggest that the relationship (correlation) between fiscal deficits and economic growth may be negative. There is also a hint from the analysis of scatter plots in Figure 6.2 that the deficit-growth relationship appears not to be significantly different between regions. However, this evidence on the relationship between fiscal deficits and GDP growth for a panel of developing countries considered in our study is only tentative and does not consider the direction of causality.

To examine the relationship between fiscal deficits and economic growth for our sample of developing countries in a robust (formal) way we proceed with estimation of our econometric model given by equation 4.8. As we discussed earlier, estimation of this model is performed using the generalised methods of moment (GMM) estimation technique developed by Arellano and Bond (1991). To do this, we follow Arellano and Bond's (1991) approach and estimate our model using all three model specifications suggested in the Arellano and Bond (1991) GMM estimator – *exogenous*, *predetermined* and *endogenous* – before we can choose the preferred model(s) based on model results and specification tests. The exogenous model assumes that all the explanatory variables are considered as strictly exogenous; the predetermined model specifies that a set of explanatory variables are considered as predetermined; and, the endogenous model treats a set of explanatory variables as endogenous.

It is worth noting that treating variables as strictly exogenous, predetermined or endogenous has a very important implication on the number of instruments used in the estimated model. If an explanatory variable is treated as strictly exogenous, then all its current and lagged values are available to use as valid instruments. In the case of a predetermined variable, the levels lagged one or more periods are valid instruments. Whereas, in the case of endogenous variable, levels lagged two or more periods qualify as valid instruments (Arellano and Bond, 1991). This means that, treating variables as predetermined or endogenous quickly increases the number of valid instruments in the model.

Given the number of explanatory variables considered in our model and the small cross-sectional dimension of our data (only thirty-one countries), we avoid the over-fitting problems in our model estimation by using a reduced number of instrumental variables. Thus, we employ a short lag structure for each of the above three specifications (exogenous, predetermined and endogenous) by considering only the current and the one-period lagged levels of the corresponding variables in our regression analysis unless otherwise stated.

Table 6.3 below presents the results obtained by using all three scenarios suggested in the Arellano and Bond (1991) GMM estimator as discussed above. Note that in analysing these results, we concentrate initially on model specification and selection of preferred model(s) and inference on the estimated coefficients is made later on.

Table 6.3: Results on the effect of total fiscal deficits on economic growth

Independent variables	Exogenous (1)	Predetermined (2)	Endogenous (3)
GDP_{-1}	-.4465434*	-.4761598***	-.4982869***
	(0.057)	*(0.000)*	*(0.000)*
GDP_{-2}	-.5177906***	-.5672662***	-.5660948***
	(0.004)	*(0.000)*	*(0.000)*
POP	.0217803*	.0205549**	.0206103**
	(0.055)	*(0.027)*	*(0.027)*
POP_{-1}	.0086501	.0132537**	.0153048***
	(0.267)	*(0.021)*	*(0.009)*
INFL	.99787486	.99644165	.998106
	(0.691)	*(0.499)*	*(0.703)*
$INFL_{-1}$	.98121724**	.98216231***	.97771027***
	(0.018)	*(0.004)*	*(0.001)*
INV	1.040759***	1.0316874**	1.0270961**
	(0.001)	*(0.029)*	*(0.043)*
INV_{-1}	1.0501645***	1.0475103***	1.0498726***
	(0.003)	*(0.000)*	*(0.000)*
OPEN	1.0214823	1.0258994*	1.0194712
	(0.195)	*(0.058)*	*(0.176)*
$OPEN_{-1}$	.99964996	.9955125	1.0069631
	(0.988)	*(0.841)*	*(0.737)*
M2	.95918664**	.95598056***	.9502704***
	(0.035)	*(0.004)*	*(0.003)*
$M2_{-1}$	.98854373	.98972208	.98943857
	(0.190)	*(0.363)*	*(0.409)*
DFCT	.0010961	-.0000256	.0001058
	(0.519)	*(0.989)*	*(0.951)*
$DFCT_{-1}$	-.0010874	-.0016763	-.0020918*
	(0.412)	*(0.165)*	*(0.099)*
GOVEXP	.91465485***	.93171547*	.92129582**
	(0.008)	*(0.068)*	*(0.018)*
$GOVEXP_{-1}$	1.0055092	1.0214972	1.0182416
	(0.814)	*(0.412)*	*(0.501)*
TAX	.005267***	.0047506***	.0051894***
	(0.000)	*(0.000)*	*(0.000)*
TAX_{-1}	.0016095	.0015185	.0023797
	(0.238)	*(0.213)*	*(0.106)*
GRANTS	1.0034119	1.0030044	1.003866
	(0.150)	*(0.196)*	*(0.077)*
$GRANTS_{-1}$	1.0027025	1.0014874	1.0021241
	(0.158)	*(0.486)*	*(0.281)*
Observations	55	55	55
Number of Countries	23	23	23
Wald Test of joint Significance	0.0000	0.0000	0.0000
Test of serial autocorrelation			
First order (m1)	0.0872	0.0833	0.0850
Second order (m2)	0.1709	0.3475	0.3390

Notes.

- *, **, *** denote significance at 10, 5, and 1 percent respectively
- The values in parentheses under the coefficients are P-values
- The problem of data availability means that only 23 (out of 31 countries developing countries included in our sample) are considered in our model estimations here.

Recall that the major focus in this section is to examine the relationship between fiscal deficits and economic growth. Our key hypothesis on this relationship is that fiscal deficits have an impact (positive or negative) on economic growth and that this impact depends on the size of deficits as a percentage of GDP – that is, the relationship between fiscal deficits and economic growth is non-linear of an inverted U-shaped type. In order to test whether the relationship between fiscal deficits and economic growth is non-linear, our initial regressions included both the fiscal deficit variable (DFCT) and the square of DFCT ($DFCT^2$) variable. When both these variables were included in the estimated model, however, the results were very poor and indicated some model specification problems. Based on these results, therefore, we concluded that the hypothesis that the relationship between fiscal deficits and economic growth was non-linear in the set of developing countries considered in this study is rejected in our model.[50] Following these results also, we decided to drop the square of DFCT ($DFCT^2$) variable in our final regressions in this section, and for all other versions of the model estimated in the subsequent sections.

Returning to the discussion of the results presented in Table 6.3 above, column (1) reports the results based on exogenous model specification. In this model, all the right-hand side variables other than the lagged dependent variables are assumed strictly exogenous.

[50] In other words, we do not find evidence of non-linear relationship between fiscal deficits and economic growth in our data.

Turning to the test statistics, the tests for first-order and second-order autocorrelation (p-values of 0.087 and 0.171, respectively) presented no evidence of model misspecification. We also estimated the Sargan test of overidentifying restrictions using the one-step homoscedastic estimator (we have not reported the results here) and this passed the test too.[51] These results, therefore, suggests that the model does not face specifications problems.

Analysis of the results on the coefficient estimates shows that the lagged GDP variable (GDP_{-1}) enters the model with a negative sign, and this is statistically significant, hence showing evidence of the so-called conditional convergence in the growth literature (Sala-i-Martin, 1996; Barro and Sala-i-Martin, 2004; Roberts, 2006). Investment (INV), degree of openness (OPEN), a proxy for financial deepening (M2), government expenditure (GOVEXP) and grants (GRANTS) all have the expected positive sign. However, only the investment variable (INV) is statistically significant at the conventional levels of significance for both the current and one-lagged period levels. The proxy for financial deepening (M2) and government expenditure (GOVEXP) are significant in the current period only, while openness (OPEN) and grants (GRANTS) are statistically insignificant in both periods.

Turning briefly to other variables in the model, population growth (POP) and tax revenue (TAX) enter the model with a positive sign in both periods, although these are significant in the current period only. The inflation variable (INFL) also enters the model with a positive sign in both periods but this is statistically significant in

[51] Note that the Sargan test of overidentifying restrictions cannot be computed when the robust estimator – vce (robust) is specified in the Arellano and Bond (1991) estimation.

the one-lag period only, a finding that suggests that inflation did not have a deterrent effect on economic growth in the set of developing countries we have considered in this study during the period 1972-2001.

Our main variable of interest in this section, fiscal deficits (DFCT), enters the model with a positive sign in the current period and a negative sign in the one-period lagged level. However, neither of these coefficient estimates were statistically different from zero at the conventional levels of significance. This suggests that fiscal deficits did not have any significant positive or negative impact of economic growth in the sample of developing countries considered in this study during the period 1972-2001.

Even though the exogenous model discussed above appears to have no evidence of misspecification problems and a number of explanatory variables enter the model with the expected signs and are statistically significant, the assumption of strict exogeneity of all explanatory variables made in this model is implausible theoretically and might not be optimal for our model. As argued earlier, the causality between some of the right-hand variables in our model and economic growth is likely to be two-way causality – that is, not only do changes in the explanatory variables affect growth but also the reverse causality is a likely possibility. For example, when an economy enjoys high economic growth, independently of fiscal policy changes, government tax revenues will very likely go up and the size of the fiscal deficit will fall, and vice versa. Similarly, high economic growth is very likely to attract a higher level of investment in an economy. One may also argue that the levels of money supply and inflation in an economy are not strictly exogenous, but determined by the monetary authorities depending on the forecasted economic performance and by commercial banks in response to changes in market conditions.

Based on the above discussion, therefore, some of the explanatory variables in our model could be treated as either predetermined or endogenous. As discussed earlier, treating some of the right-hand side variables as predetermined or endogenous increases the number of valid instruments, which may lead to improvements in the model performance.

Taking into account the possibility of no strict exogeneity of the explanatory variables, we therefore estimate our model based on the predetermined and endogenous model specifications. In column (2) we present the results based on predetermined model specification. In this model, we treat all explanatory variables as predetermined with the exception of population growth (POP) and the degree of openness (OPEN), which are assumed exogenous. We assume population growth (POP) is exogenous for consistency with the theory and approach that most of the existing empirical studies on economic growth have followed. The decision to treat the degree of openness variable (OPEN) as exogenous is due to the fact that this depends not only on the demand for imports by the domestic economy, but also on the changes in the demand for the country's exports by the rest of the world. This is an exogenous factor to the economy for small open economies like most, if not all, of the developing countries considered in this study.

The results of both the specification tests and coefficient estimates show significant improvement when compared with those for the exogenous model**.** As far as the results on the specification tests are concerned, note that the p-value of the specification tests for no second-order autocorrelation has increased considerably from 0.171 to 0.347. The Sargan test of overidentifying restrictions using the one-step homoscedastic estimator (results are not reported here) also indicated some significant improvement as compared to those of the exogenous model. In terms of the results on the coefficient estimates of the explanatory variables, these also shows that the statistical significance for many of these estimates has improved significantly as compared to those based on the exogenous model specification. Other noticeable improvement in relation to the coefficient estimates is that the coefficient estimates for the population growth variable (POP) have now become statistically significant in both current and one-lagged periods and the degree of openness variable (OPEN) has now become significant in the short-run. These results on the specification tests and coefficient estimates for the predetermined model, therefore, provide some evidence that our model is better specified as predetermined instead of exogenous.

In column (3) we present the results based on the endogenous model specification. In this model, we treat investment (INV), fiscal deficits (DFCT), government expenditure (GOVEXP) and tax revenue (TAX) as endogenous variables based on the suggestions from the literature, population growth (POP) and the degree of openness (OPEN) are treated as exogenous variables based on the reasons given in the discussion above, and all other remaining variables are treated as predetermined. The results of the model specification in this scenario present no evidence of model misspecification problems and those on coefficient estimates show that many of the explanatory variables enter the model with the expected signs.

Comparison of the results based on the endogenous and predetermined model shows that the results of the estimated coefficients for the two models are quite similar for all the explanatory variables with the exception of openness (OPEN), grants (GRANTS) and fiscal deficits (DFCT). The openness variable (OPEN), though enters both models with a positive sign for both current and one-lagged periods, but is not statistically different from zero for the case of the endogenous model. The grants variable (GRANTS), though appearing to enter both models with a positive sign for both periods' models, is only statistically significant in the current period for the endogenous model. The deficit variable (DFCT) is statistically insignificant in both periods for the case of the predetermined model while it is statistically significant in the one-lagged period for the case of the endogenous model.

When comparing the results of the specification tests for the two models, however, these show that the predetermined model is slightly better than the endogenous model (the p-value of the specification tests for no second-order autocorrelation is 0.347 for the predetermined model and 0.339 for the endogenous model). On the basis of these results, therefore, it can be argued that, although there is no significant difference in treating investment and fiscal variables as either predetermined or endogenous, our model still performs better when modelled as predetermined.

Turning to the inference on the coefficient estimates for our preferred model specification, the predetermined model, lagged GDP (GDP_{-1}) enters the model with a negative and statistically significant sign, suggesting that the set of developing countries considered in this study experienced conditional convergence during the period 1972-2001. Investment (INV), degree of openness (OPEN), a proxy for financial deepening (M2), government expenditure (GOVEXP) and grants (GRANTS) enter the model with the expected positive sign. However, only the investment (INV) variable is statistically significant for both the current and one-lagged period levels. The degree of openness (OPEN), proxy for financial deepening (M2) and government expenditure (GOVEXP) are statistically significant in the current period only, while grants (GRANTS) is statistically insignificant in both periods.

The estimated coefficients for population growth (POP), inflation (INFL) and tax revenue (TAX) have a positive sign in both the current and one-lagged periods. However, only population growth (POP) is significant in both periods, while tax revenue (TAX) is significant in the current period only, and inflation (INFL) is significant in the one-lag period only. This section's focus variable, DFCT, enters the model with a negative but statistically insignificant sign for both the current and one-lagged periods, which suggests that fiscal deficits did not have any significant impact on economic growth.

To sum up on our overall results with respect to the effect of fiscal deficits on economic growth, which is the major focus of analysis in this section, the evidence at hand suggests that fiscal deficits per se did not have any significant impact on economic growth in the set of developing countries considered in this study. As discussed earlier, we also find no evidence of any presence of a non-linear relationship between fiscal deficits and growth either. In comparison with the empirical studies we reviewed in Chapter Three, our findings are generally similar to those of Nelson and Singh (1994) who also find no evidence of significant impact of fiscal deficits on economic growth in a cross-section of seventy developing countries. However, they are in sharp contrast to the study by Adam and Bevan (2005) which finds the presence of a non-linear relationship between deficits and economic growth in the context of developing countries.[52]

This section was devoted to the analysis of the impact of fiscal deficits per se on economic growth. However, the literature we reviewed in Chapter Three shows that the impact of fiscal deficits on growth may depend on the ways in which the deficits are financed and what deficit financing is used for. The next two sections, therefore, examine the economic growth impact of the alternative ways of deficit financing and the components of government expenditure, respectively.

[52] However, it should be noted that there are differences between these studies with regard to the model specification, time period and sample of countries considered.

6.4 Deficit Financing and Economic Growth

As mentioned above, this section considers the growth impact of the alternative ways of financing fiscal deficits. The rationale for doing so is that, as discussed earlier in Chapter Three, a strand of the literature on deficit-growth connection shows that the impact of fiscal deficits on growth may depend on the ways fiscal deficits are financed. Following this, we hypothesised the following in Chapter Four. First, financing deficits by domestic borrowing is most likely to retard growth following the likely crowding out effect of private investment as this form of deficit financing leads to government competing with the private sector for the available financial resources. Second, financing deficits by excessive foreign borrowing may lead to unsustainable levels of foreign debt, something which can have detrimental effects on economic growth. Third, financing the budget deficit by monetisation may be inflationary, which can have negative effects on economic growth. To test these hypotheses, therefore, we substitute the deficit variable in our regression model by its different sources of financing. However, given the way the data are reported in our main source of data on fiscal variables - IMF's Government Finance Statistics - we are able to classify deficit financing into two categories only; *domestic financing* and *external financing*.[53] The former comprises short-term and long-term borrowing from domestic financial institutions and the private sector, and changes in cash and deposits. On the other hand, the latter comprises borrowing from the international development institutions and foreign governments (IMF's GFS manuals - various issues).

[53] Note that both domestic financing and external financing are given as a percentage of GDP in the model estimation.

As in the previous section, we started our analysis be checking that our model does not suffer from a multicollinearity problem. This analysis was performed using correlation analysis and examination of variance inflation factors (VIFs). Correlation analysis was carried out by examining the correlation matrix presented in Table 6.2 and this suggested that multicollinearity, though present, was not severe in our model as most of the respective pairwise correlations seemed to be reasonably low. The results on estimated VIFs (as reported below) again presented more evidence that multicollinearity was not serious in our model, as the highest score was just 4.73 - which is far below the critical value of 10.

Variation Inflation Factors

Variable	*VIF*	*1/VIF*
GOVEXP	4.73	0.211305
TAX	3.01	0.332720
M2	2.53	0.395695
OPEN	2.15	0.465562
DFIN	1.96	0.510862
GRANTS	1.88	0.530883
INV	1.77	0.565527
INFL	1.74	0.576276
EXTFIN	1.46	0.685864
POP	1.37	0.731940
GDP_{-1}	1.33	0.752421
Mean VIF	2.17	

Given this, we proceeded with the model estimation using the Arellano and Bond (1991) estimation technique and the results obtained by employing all three proposed specifications are presented in Table 6.4 below.

Table 6.4: Results on the effect of the alternative ways of deficit financing on economic growth

Independent variables	Exogenous (1)	Predetermined (2)	Endogenous (3)
GDP_{-1}	-.6269126***	-.5228141***	-.5228141***
	(0.001)	*(0.000)*	*(0.000)*
GDP_{-2}	-.67888***	-.6539782***	-.6539782***
	(0.000)	*(0.000)*	*(0.000)*
POP	.0262807**	.0248006**	.0248006**
	(0.063)	*(0.034)*	*(0.034)*
POP_{-1}	.0117746	.0157206**	.0157206**
	(0.162)	*(0.012)*	*(0.012)*
INFL	.98930203**	.99032313**	.99032313**
	(0.015)	*(0.024)*	*(0.024)*
$INFL_{-1}$	.98176157***	.98405656***	.98405656***
	(0.000)	*(0.000)*	*(0.000)*
INV	1.0555659***	1.0412581***	1.0412581***
	(0.000)	*(0.001)*	*(0.001)*
INV_{-1}	1.0625911**	1.0542306***	1.0542306***
	(0.020)	*(0.005)*	*(0.005)*
OPEN	1.0364886**	1.0490091***	1.0490091***
	(0.030)	*(0.001)*	*(0.001)*
$OPEN_{-1}$	.99478146	.98827113	.98827113
	(0.792)	*(0.394)*	*(0.394)*
M2	.90232456***	.90891464***	.90891464***
	(0.000)	*(0.000)*	*(0.000)*
$M2_{-1}$	1.0154388	1.0121416	1.0121416
	(0.567)	*(0.550)*	*(0.550)*
DFIN	.0005159	.0002091	.0002091
	(0.675)	*(0.848)*	*(0.848)*
$DFIN_{-1}$	-.0023387**	-.0029796**	-.0029796**
	(0.098)	*(0.016)*	*(0.016)*
EXTFIN	.0016806	.0016682	.0016682
	(0.256)	*(0.272)*	*(0.272)*
$EXTFIN_{-1}$	-.0058541**	-.0063697**	-.0063697**
	(0.080)	*(0.019)*	*(0.019)*
GOVEXP	.93591389***	.93269606***	.93269606***
	(0.001)	*(0.001)*	*(0.001)*
$GOVEXP_{-1}$	1.038165	1.0578511**	1.0578511**
	(0.274)	*(0.045)*	*(0.045)*
TAX	.0072586***	.0066872***	.0066872***
	(0.000)	*(0.000)*	*(0.000)*
TAX_{-1}	.0017395	.0012105	.0012105
	(0.494)	*(0.473)*	*(0.473)*
GRANTS	1.0036857	1.003739	1.003739
	(0.298)	*(0.144)*	*(0.144)*
$GRANTS_{-1}$	1.0005874	.99940428	.99940428
	(0.842)	*(0.812)*	*(0.812)*
Observations	49	49	49
Number of Countries	20	20	20
Wald Test of joint Significance	0.0000	0.0000	0.0000
Test of serial autocorrelation			
First order (m1)	0.0191	0.0254	0.0254
Second order (m2)	0.2112	0.3077	0.3077

- *, **, *** denote significance at 10, 5, and 1 percent respectively
- The values in parentheses under the coefficients are P-values
- The problem of data availability means that only 20 (out of 31 countries developing countries included in our sample) are considered in our model estimations here.

It is important to note that, as in the previous section, we will concentrate initially on model specification and selection of preferred model(s) and then make inferences on the estimated coefficients made for our preferred model(s) later on.

Turning to the results presented in Table 6.4, column (1) reports the results corresponding to the exogenous model specification. The test for autocorrelation shows no evidence of serial correlation in the first differenced residuals at order 2 (m_1 = 0.019 and m_2 = 0.211). The model also passed the Sargan test of overidentifying restrictions.[54] Thus, the model passes both specification tests, and in doing so, presents evidence of no misspecification problems.

Similar to the results in the previous section, the coefficient on the lagged GDP (GDP_{-1}) is negative and strongly significant, thus providing further evidence of conditional convergence in the studied countries. In addition, the coefficient estimates on investment (INV), degree of openness (OPEN), a proxy for financial deepening (M2), government expenditure (GOVEXP) and grants (GRANTS) are again positive, consistent with the results in the previous section and the theory. However, only the investment variable (INV) appears to have significantly influenced economic growth in both periods. The coefficients for the degree of openness (OPEN), a proxy for financial deepening (M2) and government expenditure (GOVEXP) are statistically significant in the current period only, while grants (GRANTS) is again insignificant in both periods.

[54] Note that the Sargan test of overidentifying restrictions was performed for a one-step homoscedastic estimator case (we do not report the results here) to check if overidentiying restrictions are valid.

Again, the coefficients for population growth (POP), inflation (INFL) and tax revenue (TAX) are positive, consistent with our results in the previous section. However, only the coefficients for inflation (INFL) appear to be statistically significant in both the current and one-lagged periods, while the coefficients for population growth (POP) and tax revenue (TAX) are significant in the current period only.

The results on our main variables of interest in this section - domestic financing (DFIN) and external financing (EXTFIN) of deficits shows that both variables entered the model with a positive sign in the current period and a negative sign in the one-lagged period, although the results were statistically significant for the lagged period only. These results, therefore, suggest that both domestic financing and external financing of deficits, while not having any immediate significant effect on economic growth, exerted a negative and statistically significant effect on growth with a lag.

Generally, analysis of the results based on the exogenous specification shows that the model does not face misspecification problems and most of the explanatory variables enter the model with the expected signs. However, as argued in the previous section, the assumption of strict exogeneity might not be optimal (i.e., it is unrealistic) for our model. We suggest that a number of explanatory variables in our model should be considered as either predetermined or endogenous. Thus, it is important that we re-estimate our model using the predetermined and endogenous specifications.

On the basis of the above, columns (2) and (3) present the results based on predetermined and endogenous model specifications, respectively. We follow the criteria used in the previous section to specify these models. In the predetermined model, we treat all explanatory variables as predetermined with the exception of population growth and the degree of openness variables, which are treated as strictly exogenous. For the endogenous model, we treat all the fiscal variables and investment variable as endogenous, population growth and the degree of openness variables are treated as strictly exogenous, and all other variables are considered as predetermined.

Comparing columns (2) and (3) shows that the results based on the predetermined and endogenous model estimations are quite similar in terms of test statistics and coefficient estimates. Both models passed the specification tests of no autocorrelation in the first differenced residuals at order 2 (m_1 = 0.025 and m_2 = 0.308) and the Sargan test of overidentifying restrictions. The coefficient estimates on the explanatory variables are also similar in terms of signs, significance and magnitude. This suggests that it does not make a difference in treating fiscal variables and investment as either predetermined or endogenous.

The results in columns (2) and (3) also show significant improvement as compared to the results based on exogenous model specification. The p-values of the specification tests for no first-order and second-order autocorrelation in columns (2) and (3) have increased from 0.019 to 0.025 and 0.211 to 0.308, respectively. The results also show some improvement in the coefficient estimates – e.g. p-values for many coefficient estimates have improved and the coefficient estimates for two more variables, population growth (POP) and government expenditure (GOVEXP) have now become statistically significant in both periods. These results provide further evidence that our model is better modelled as either predetermined or endogenous - hence our preferred models in this section.

Further analysis of the results on the coefficient estimates for our preferred models show that these are largely similar to those of our preferred model in the previous section. Once again, Lagged GDP enters our preferred models with a negative and statistically significant sign. Similarly, coefficient estimates for investment (INV) and population growth (POP) are positive and statistically significant for both the current and one-lagged period as in the previous section, while those for the degree of openness (OPEN), a proxy for financial deepening (M2) and tax revenue (TAX) are again positive and statistically significant in the current period only. Note also that the grants variable (GRANTS) is again positive but statistically insignificant in both periods.

As far as the results for the remaining control variables used in the estimations are concerned, inflation (INFL) and government expenditure (GOVEXP) now enters our preferred models with a positive and statistically significant sign in both periods. These results are slightly different from the ones we obtained for these variables in the previous section.

Turning to this section's focus variables, domestic financing (DFIN) and external financing (EXTFIN) are negative and statistically significant for the one-lagged period in all scenarios. These results imply that both forms of deficit financing exerted a significant negative effect on economic growth in developing countries with a lag. It is important to point out that these results are somewhat surprising given our earlier results that the overall fiscal deficits did not have any significant impact on growth in developing countries. However, based on a careful investigation of this paradox in terms of the results on the overall deficit and deficit financing, and the procedures we followed in carrying out the estimations, we suspect that this is a data quality issue. Recall that, while we included the total fiscal deficit variable in the empirical model that we used to estimate the impact of the overall fiscal deficits on growth, this variable was simply replaced by the two variables representing the sources of deficit financing in the model that examines the growth impact of the ways the fiscal deficits are financed. Another possible explanation of these differences in the results is that our model estimations in this section employs a smaller sample (only 20 countries and 49 observations) than the one we used in estimating the impact of overall fiscal deficits on growth (23 countries and 55 observations)[55].

6.5 Composition of Government Expenditure and Economic Growth

Research on the relationship between the composition of government expenditure and economic growth has shed some light that certain components of government

[55]Hence, this suggests that the results are also sensitive to the use of different model formulations and the set of countries picked up in model estimation.

expenditure lead to higher economic growth than others (Landau, 1983; Aschauer, 1989; Barro, 1990, 1991; Levine and Renelt, 1992; Easterly and Rebelo, 1993; Barro and Sala-i-Martin; 1995; Chu *et al*., 1995; Devarajan *et al.*, 1996; Ghosh and Gregoriou, 2006; among others). Many observers in this research classify government expenditures into 'productive' and 'unproductive' expenditures, and argue that spending associated with the former category promotes economic growth while spending associated with the latter category has little or no impact on economic growth (Landau, 1983; Aschauer, 1989; Barro, 1990, 1991; Chu *et al*., 1995; Barro and Sala-i-Martin; 1995; Devarajan *et al*., 1996; Ghosh and Gregoriou, 2006; among others).

A strand of literature we reviewed in Chapter Three shows that fiscal deficits associated with 'productive expenditure' will most likely enhance economic growth, while fiscal deficits associated with some categories of largely current expenditure will have little or no impact on growth. In this section, therefore, we empirically investigate whether fiscal deficits in the sample of developing countries considered in our study were associated with productive expenditure or not. We proceed with this investigation in two steps. First, we consider the economic classification of government expenditure by disaggregating total government expenditure into capital expenditure and current expenditure. Second, we consider the functional classification (also known as sectoral classification) of government expenditure by disaggregating government expenditure into various categories of sectoral spending.

(i) Economic classification of government expenditure and economic growth

Economic classification of government expenditure categorises expenditure into capital and current expenditure. A commonly held view between these two types of government expenditure is that capital expenditure is most likely to promote economic growth while current expenditure will be less associated with economic growth (Deverajan *et al*., 1996). According to this view, therefore, government capital expenditure would be seen as productive expenditure and government current expenditure would be considered unproductive expenditure. However, the existing empirical literature finds conflicting results regarding the economic growth impact of these two types of expenditure. For example, studies by Aschauer (1989), Barro (1990, 1991) and Gupta *et al.* (2005) find that capital expenditure is associated with productive spending while current expenditure is associated with unproductive spending. On the other hand, however, Devarajan *et al*. (1996), and Ghosh and Gregoriou (2006) find that current spending has a positive effect on growth while capital spending has a negative effect on growth. Then again, in other studies, Holtz-Eakin (1994); and, Evans and Karras (1994) find that public capital investment has no significant impact on growth.

Given these mixed results in the existing studies, we follow the spirit of Devarajan *et al*. (1996), Miller and Russek (1997), Ghosh and Gregoriou (2006), and Benos (2009) and refrain from making an a-priori classification of public expenditure into 'productive' and 'unproductive'. Instead, we allow the data to tell us which components of government expenditure were productive and which ones were unproductive in the set of developing countries considered in our study. Our argument here is that fiscal deficits associated with financing economic expenditure found to be 'productive' would most likely be growth promoting in the context of developing countries, while deficit financing allocated towards expenditure that seems to be 'unproductive' will less likely promote growth.

As in the previous sections, before we proceed with model estimation, we first checked for multicollinearity using both correlation analysis and estimation of variance inflation factors (VIFs). In terms of correlation analysis, investigation of all respective pairwise correlations (see Table 6.2) suggested no presence of multicollinearity problem in the model. Calculated VIFs (see estimated VIFs below) looked fine too as all were less than the critical value of ten. The highest VIF score was 4.46 while the mean VIF was 2.91.

Variation Inflation Factors

Variable	*VIF*	*1/VIF*
CURREXP	4.86	0.205865
TAX	3.33	0.300461
CAPEXP	2.32	0.431713
INV	2.09	0.478351
OPEN	1.92	0.521112
GRANTS	1.89	0.530486
M2	1.79	0.558439
DFCT	1.73	0.578044
INFL	1.64	0.607998
GDP_{-1}	1.39	0.718126
POP	1.36	0.732669
Mean VIF	2.21	

Having satisfied that multicollinearity is not a problem in our model, we went on to perform the regression analysis using all three Arellano and Bond (1991) model specifications, and the results are as presented in Table 6.5(a) below.

In regression (1) all explanatory variables are assumed to be exogenous. The test for autocorrelation shows no evidence of serial autocorrelation in the first differenced residuals at order 2 (m1 = 0.698 and m2 = 0.4143). The model also passed the Sargan test of overidentifying restrictions (results are not reported here) too.[56] These results suggest that the model does not face specification problems. However, poor results of the coefficient estimates make one think that perhaps the assumption of strict exogeneity of all explanatory variables is not optimal and/or is unrealistic for our model. Besides, the results obtained in the previous two sections in this regard suggest that some of the explanatory variables are better modelled as either predetermined or endogenous instead of strictly exogenous.

On the basis of the above, in regression (2) all explanatory variables are assumed to be predetermined with the exception of population growth and degree of openness, which are treated as strictly exogenous like in the previous sections. In regression (3) in turn, we treat all the fiscal variables and investment as endogenous, population growth and degree of openness are treated as treated as strictly exogenous, and all other variables are treated as predetermined.

[56] Note that the Sargan test of overidentifying restrictions was performed for a one-step homoscedastic estimator case (we do not report the results here) to check if overidentifying restrictions are valid.

The results of the specification tests for the two models are slightly better than the model that assumes strict exogeneity of all explanatory variables, hence providing further evidence that some of the explanatory variables in our model are better modelled as either predetermined or endogenous. Further analysis of the results of the two models also shows that, like in the previous section, it does not make a difference treating fiscal variables and investment as either predetermined or endogenous as the results for both test statistics and coefficient estimates in these two models are very similar.

Table 6.5(a) Results on the effect of capital and current expenditure on economic growth

Independent variables	Exogenous (1)	Predetermined (2)	Endogenous (3)
GDP_{-1}	-.3136223	-.4617318***	-.4617318***
	(0.142)	*(0.000)*	*(0.000)*
GDP_{-2}	-.435288***	-.5232596***	-.5232596***
	(0.007)	*(0.000)*	*(0.000)*
POP	.0271094**	.023161**	.023161**
	(0.051)	*(0.031)*	(0.031)
POP_{-1}	.0011738	.0093506	.0093506
	(0.900)	*(0.107)*	*(0.107)*
INFL	.99708446	.9977225	.9977225
	(0.664)	*(0.741)*	*(0.741)*
$INFL_{-1}$	.98689286	.98226495**	.98226495**
	(0.158)	*(0.026)*	*(0.026)*
INV	1.0566778***	1.0452477***	1.0452477***
	(0.000)	*(0.006)*	*(0.006)*
INV_{-1}	1.0518576***	1.0420815***	1.0420815***
	(0.004)	*(0.002)*	*(0.002)*
OPEN	1.0164515	1.0145955	1.0145955
	(0.413)	*(0.471)*	*(0.471)*
$OPEN_{-1}$	.97273314	.98701662	.98701662
	(0.193)	*(0.511)*	*(0.511)*
M2	.94316655***	.94327473***	.94327473***
	(0.003)	(0.001)	*(0.001)*
$M2_{-1}$	1.0055124	1.0060957	1.0060957
	(0.696)	*(0.672)*	*(0.672)*
DFCT	-.0009482	-.0017221	-.0017221
	(0.494)	*(0.118)*	*(0.118)*
$DFCT_{-1}$	-.0014571	-.001452	-.001452
	(0.334)	*(0.210)*	*(0.210)*
CURREXP	.9927236	.9988152	.9988152
	(0.706)	*(0.953)*	*(0.953)*
$CURREXP_{-1}$	.98996034	.97976964	.97976964
	(0.699)	*(0.412)*	*(0.412)*

CAPEXP	.99108656	.99074678	.99074678
	(0.375)	*(0.246)*	*(0.246)*
CAPEXP$_{-1}$	.99167445	.99985641	.99985641
	(0.352)	*(0.986)*	*(0.986)*
TAX	.004564***	.0041407***	.0041407***
	(0.000)	*(0.000)*	*(0.000)*
TAX$_{-1}$	.0027574**	.0027553**	.0027553**
	(0.054)	*(0.031)*	(0.031)
GRANTS	1.0028299	1.0033745	1.0033745
	(0.242)	*(0.143)*	(0.143)
GRANTS$_{-1}$	1.0024697	1.0016502	1.0016502
	(0.262)	*(0.400)*	*(0.400)*
Observations	52	52	52
Number of Countries	22	22	22
Wald Test of joint Significance	0.0000	0.0000	0.0000
Test of serial autocorrelation			
First order (m1)	0.0698	0.0773	0.0773
Second order (m2)	0.4143	0.6905	0.6905

- *, **, *** denote significance at 10, 5, and 1 percent respectively
- The values in parentheses under the coefficients are P-values
- The problem of data availability means that only 22 (out of 31 countries developing countries included in our sample) are considered in our model estimations here.

Turning to the analysis of coefficient estimates in our preferred specifications, coefficient estimates for lagged GDP, Investment (INV), a proxy for financial deepening (M2) and grants (GRANTS) are quite similar to those we obtained in the previous two sections both in terms of the direction and significance. Population growth (POP) is now statistically significant in the current period only, while inflation (INFL) is statistically significant in the one-lagged period only. Contrary to our results in the previous two sections, degree of openness (OPEN) is now insignificant in both periods. Tax revenue (TAX) still enters our model with a positive sign and is now statistically significant in both periods.

The estimated coefficients on the fiscal deficit variable (DFCT), after disaggregating government expenditure into current and capital expenditure, show that the effect of fiscal deficits on economic growth was not statistically different from zero, consistent with our earlier results in section 6.3[57]. These results again suggest that fiscal deficits did not have any significant effect on economic growth in the sample of developing countries we have considered in this study during the period 1972-2001.

With regard to the focus variables in this section, the results show that both current expenditure (CURREXP) and capital expenditure (CAPEXP) had positive but statistically insignificant effects on economic growth. This means that both capital expenditure and current expenditure were, on average, not productive in the sample of developing countries we have considered in this study during the period 1972 – 2001. However, we suspect that the lack of statistical significance may have been contributed by variability in productivity in the countries considered in our sample.

(ii) Functional classification of government expenditure and economic growth

In addition to the economic classification, government expenditure can be classified based on functional expenditure (also known as sectoral expenditure). In this section, therefore, we disaggregate government expenditure into functional expenditure to investigate which components of this expenditure were growth enhancing, if any, and which ones were not, and what this would imply on the deficit spending policy in developing countries.

[57]Thus, fiscal deficits variable enters our model as statistically not different from zero irrespective of whether we consider total government expenditure (as we did in section 6.3) or we disaggregate government expenditure into current and capital expenditure in our model.

Given the way data on functional expenditure are reported in IMF's Government Finance Statistics, our main source data on fiscal variables, our data on functional spending were classified into the following categories: *spending on general public services*, *defence*, *education*, *health*, *economic services*, *social security and welfare*, and *other expenditure*. However, due to the poor data availability and quality, social security and welfare expenditure and other expenditure categories were not included in our final model estimation and analysis.

Before we proceed with our analysis, however, it is worth noting that neither economic theory nor empirical evidence provides clear-cut answers on the relationship between different types of sectoral composition of government expenditure and economic growth. The theory generally provides a rationale for government provision of goods and services based on the market failure to provide public goods and internalise externalities (Devarajan *et al*., 1996). Based on this theoretical reasoning, Arrow and Kurz (1970) and Barro (1990) present theoretical models showing that all government spending is productive.

More recently, however, the development of endogenous growth theory a number of empirical studies have tried to link particular components sectoral spending (such as transport and communication, education and health) and economic growth. For example, Easterly and Rebelo (1993) and Odedokun (2001) show that investment in transport and communications has a positive and significant impact on economic growth. Barro and Sala-i-Martin (1995, 2004), Barro and Lee (2001), Bleaney *et al*. (2001), Odedokun (2001) and, Ghosh and Gregoriou (2006) show that spending on education has a positive impact on growth. Miller and Russek (1997), Bleaney *et al*. (2001), and, Ghosh and Gregoriou (2006) find that health expenditure has a positive impact on growth. On the other hand, Devarajan *et al*. (1996) find that expenditure in all these sectors – transport and communication, education and health – has either a negative or an insignificant impact on economic growth.

As in the previous section, we proceed with our analysis here in the spirit of Devarajan *et al*. (1996), Ghosh and Gregoriou (2006) and Benos (2009) by not classifying public expenditure as being productive and unproductive to begin with, but let the data to tell us which components of sectoral spending were productive in the set of developing countries we have considered in our study.

Once again, we started our analysis by checking for multicollinearity using correlation analysis and estimated variation inflation factors (VIFs). Examination of relevant pairwise correlations (given in the correlation matrix presented in Table 6.2) and VIFs (see calculated VIFs below) both suggested that multicollinearity is not an issue of concern in our model. The highest VIF score was 6.67 while the mean VIF was just 2.76.

Variation Inflation Factors

Variable	*VIF*	*1/VIF*
HLTHEXP	6.67	0.149910
EDUEXP	5.12	0.195231
TAX	4.66	0.214439
OPEN	3.70	0.270541
M2	2.59	0.385808
PSEXP	2.40	0.415960
DEFEXP	2.03	0.493419
INV	1.94	0.514356
ECONEXP	1.90	0.526262
POP	1.79	0.559196
GRANTS	1.51	0.664007
DFCT	1.49	0.670959
GDP_{-1}	1.46	0.685027
INFL	1.43	0.697632
Mean VIF	2.76	

Given the results on the multicollinearity check above, we carried on with regression analysis and the results were as given in Table 6.5 (b) below. In regression (1) all the explanatory variables are treated as strictly exogenous. In regression (2) they are all treated as predetermined with the exception of population growth and degree of openness which are again considered as strictly exogenous like in the previous sections. In regression (3) in turn, all fiscal variables and investment are treated as endogenous, population growth and degree of openness are considered as strictly exogenous, and all other variables are treated as predetermined.

Table 6.5(b) Results on the effect of government functional spending on economic growth

Independent variables	Exogenous (1)	Predetermined (2)	Endogenous (3)
GDP_{-1}	-.6048181***	-.5149819***	-.5149819***
	(0.003)	*(0.001)*	*(0.001)*
GDP_{-2}	-.9118759***	-.8698699***	-.8698699***
	(0.000)	*(0.000)*	*(0.000)*
POP	.0268864***	.0259719**	.0259719**
	(0.006)	*(0.013)*	*(0.013)*
POP_{-1}	-.0063358	-.0066219	-.0066219
	(0.563)	*(0.638)*	*(0.638)*
INFL	1.000108	.99918164	.99918164
	(0.989)	*(0.913)*	*(0.913)*
$INFL_{-1}$	.98308784	.98340425**	.98340425**
	(0.108)	*(0.064)*	*(0.064)*
INV	1.0768379***	1.0633439***	1.0633439***
	(0.000)	*(0.000)*	*(0.000)*
INV_{-1}	1.0476566*	1.0518008**	1.0518008**
	(0.074)	*(0.044)*	*(0.044)*
OPEN	1.0433483**	1.0553147***	1.0553147***
	(0.020)	*(0.009)*	*(0.009)*
$OPEN_{-1}$	1.0080111	1.0049105	1.0049105
	(0.834)	*(0.893)*	*(0.893)*
M2	.891092***	.89336513***	.89336513***
	(0.000)	*(0.000)*	*(0.000)*
$M2_{-1}$	1.0563399*	1.0345917	1.0345917
	(0.061)	*(0.165)*	*(0.165)*
DFCT	-.0008887	-.0018668	-.0018668
	(0.717)	*(0.335)*	*(0.335)*
$DFCT_{-1}$	.0011307	.0007856	.0007856
	(0.438)	*(0.524)*	*(0.524)*
PSEXP	1.0167872*	1.0148959	1.0148959
	(0.063)	*(0.116)*	*(0.116)*
$PSEXP_{-1}$	.96880309**	.97014736**	.97014736**
	(0.021)	*(0.046)*	*(0.046)*
DEFEXP	1.0281636	1.0299214	1.0299214
	(0.120)	*(0.110)*	*(0.110)*
$DEFEXP_{-1}$	.97749373	.97851428	.97851428
	(0.228)	*(0.223)*	*(0.223)*
EDUEXP	.9942491	.99720083	.99720083
	(0.723)	*(0.875)*	*(0.875)*
$EDUEXP_{-1}$	1.0068161	1.0060699	1.0060699
	(0.641)	*(0.655)*	*(0.655)*
HLTHEXP	.94468882	.93227448**	.93227448**
	(0.154)	*(0.043)*	*(0.043)*
$HLTHEXP_{-1}$	.97665023	.975106	.975106
	(0.417)	*(0.360)*	*(0.360)*
ECONEXP	1.008467	1.0135298	1.0135298
	(0.330)	*(0.169)*	*(0.169)*
$ECONEXP_{-1}$	1.0043289	1.0072862	1.0072862
	(0.773)	*(0.617)*	*(0.617)*
TAX	.0020111	.0014046	.0014046
	(0.380)	*(0.503)*	*(0.503)*

TAX_{-1}	.0023876	.0028994*	.0028994*
	(0.219	*(0.077)*	*(0.077)*
GRANTS	.99894486	.99852459	.99852459
	(0.808)	*(0.729)*	*(0.729)*
GRANTS	1.0007063	1.0002455	1.0002455
	(0.858)	*(0.942)*	*(0.942)*
Observations	39	39	39
Number of Countries	17	17	17
Wald Test of joint Significance	0.0000	0.0000	0.0000
Test of serial autocorrelation			
First order (m1)	0.0501	0.0620	0.0620
Second order (m2)	0.0591	0.4201	0.4201

- *, **, *** denote significance at 10, 5, and 1 percent respectively
- The values in parentheses under the coefficients are P-values
- The problem of data availability means that only 17 (out of 31 countries developing countries included in our sample) are considered in our model estimations here.

The results on model specification are better in regressions (2) and (3) since the specification tests of no autocorrelation in the first differenced residual at order 2 in these two regressions are m1 = 0.0620 and m2 = 0.4201 as compared to m1 = 0.0501 and m2 = 0.0591 in regression (1). This means that treating explanatory variables, with the exception of population growth and the degree of openness, as either predetermined or endogenous makes it even more difficult to reject the hypothesis of no autocorrelation in the first differenced residuals at order 2 as compared to when all explanatory variables in our model are treated as strictly exogenous. The results therefore suggest that some of the explanatory variables are better modelled as either predetermined or endogenous instead of strictly exogenous.

Comparison of the results based on predetermined and endogenous specifications once again shows that the results for these two specifications are very similar with respect to both specification tests and coefficient estimates. This implies that it still does not make a difference in modelling fiscal variables and investment as either predetermined or endogenous. It is also interesting to note that many coefficient estimates in these two specifications are largely consistent with those obtained in the first three versions of our model. For example, similar to the results for our preferred models in the previous three versions, lagged GDP is negatively and significantly associated with GDP growth. Additionally, like the results for our preferred models in the previous versions, investment (INV) appears to have a positive and statistically significant effect on economic growth in both periods, a proxy for financial deepening (M2) is statistically significant in the current period only and grants (GRANTS) is positive but statistically insignificant in both periods.

As far as the results on the coefficient estimates for other variables in our model are concerned, population growth (POP), degree of openness (OPEN), inflation (INFL) and tax revenue (REV) still enter both models with a positive sign. However, population growth (POP) and degree of openness (OPEN) are statistically significant in the current period only, while inflation (INFL) and tax revenue (TAX) appear to be significant in the one-lagged period only.

Regarding the results on the components of government expenditure, which is this section's focus variables, we find that spending on education (EDUEXP), defence (DEFEXP) and economic services (ECONEXP) had positive but statistically insignificant effects on economic growth. On the other hand, health expenditure (HLTHEXP) had an instantaneous positive and significant effect on growth, while public service expenditure (PSEXP) had a significant positive effect on economic growth with a lag.

Finally, the results on the fiscal deficits variable (DFCT), once again, suggest that deficit spending did not have any statistically significant impact on economic growth in developing countries during the period 1972-2001. This finding is not surprising given the weak impact most of the components of government expenditure appear to have had on economic growth in developing countries as our empirical results suggest.

To conclude on the composition of government expenditure and economic growth, our results show that most of the components of government expenditure did not have any significant impact on economic growth in developing countries for the period 1972-2001. These results hold when total government spending is disaggregated based on either economic classification or sectoral classification of government expenditure. The implication of this finding on the impact of deficit spending policy on economic growth is straightforward – deficit spending would not have a significant positive impact on economic growth when this spending is associated with financing government activities which are not growth enhancing.

6.6 Analysis of the Results on Control Variables

The major focus of discussion in sections 6.3 to 6.5 above was on the deficit-growth connection. The discussion examined the impact of fiscal deficits on economic growth. It also examined how the deficit-growth link depends on the alternative ways of deficit financing and the composition of government expenditure. This section, in turn, discusses some general findings of the results for the control variables we considered in our regression model. To do this, we only consider the results from our preferred specifications from each version of the model we estimated in sections 6.3 – 6.5 above. These results are presented in Table 6.6 below.

Table 6.6: Summary of the results on control variables

Independent variables	(1)	(2)	(3)	(4)
GDP_{-1}	-.4761598***	-.5228141***	-.4617318***	-.5149819***
	(0.000)	*(0.000)*	*(0.000)*	*(0.001)*
GDP_{-2}	-.5672662***	-.6539782***	-.5232596***	-.8698699***
	(0.000)	*(0.000)*	*(0.000)*	*(0.000)*
POP	.0205549**	.0248006**	.023161**	.0259719**
	(0.027)	*(0.034)*	*(0.031)*	*(0.013)*
POP_{-1}	.0132537**	.0157206**	.0093506	-.0066219
	(0.021)	*(0.012)*	*(0.107)*	*(0.638)*
INFL	.99644165	.99032313**	.9977225	.99918164
	(0.499)	*(0.024)*	*(0.741)*	*(0.913)*
$INFL_{-1}$	.98216231***	.98405656***	.98226495**	.98340425*
	(0.004)	*(0.000)*	*(0.026)*	*(0.064)*
INV	1.0316874**	1.0412581***	1.0452477***	1.0633439***
	(0.029)	*(0.001)*	*(0.006)*	*(0.000)*
INV_{-1}	1.0475103***	1.0542306***	1.0420815***	1.0518008**
	(0.000)	*(0.005)*	*(0.002)*	*(0.044)*
OPEN	1.0258994*	1.0490091***	1.0145955	1.0553147***
	(0.058)	*(0.001)*	*(0.471)*	*(0.009)*
$OPEN_{-1}$	.9955125	.98827113	.98701662	1.0049105
	(0.841)	*(0.394)*	*(0.511)*	*(0.893)*
M2	.95598056***	.90891464***	.94327473***	.89336513***
	(0.004)	*(0.000)*	(0.001)	*(0.000)*
$M2_{-1}$	.98972208	1.0121416	1.0060957	1.0345917
	(0.363)	*(0.550)*	*(0.672)*	*(0.165)*
DFCT	-.0000256		-.0017221	-.0018668
	(0.989)		*(0.118)*	*(0.335)*
$DFCT_{-1}$	-.0016763		-.001452	.0007856
	(0.165)		*(0.210)*	*(0.524)*
DFIN		.0002091		
		(0.848)		
$DFIN_{-1}$		-.0029796**		
		(0.016)		
EXTFIN		.0016682		
		(0.272)		
$EXTFIN_{-1}$		-.0063697**		
		(0.019)		
GOVEXP	.93171547*	.93269606***		
	(0.068)	*(0.001)*		
$GOVEXP_{-1}$	1.0214972	1.0578511**		
	(0.412)	*(0.045)*		

CURREXP			.9988152	
			(0.953)	
$CURREXP_{-1}$			.97976964	
			(0.412)	
CAPEXP			.99074678	
			(0.246)	
$CAPEXP_{-1}$			.99985641	
			(0.986)	
PSEXP				1.0148959
				(0.116)
$PSEXP_{-1}$				.97014736**
				(0.046)
DEFEXP				1.0299214
				(0.110)
$DEFEXP_{-1}$				.97851428
				(0.223)
EDUEXP				.99720083
				(0.875)
$EDUEXP_{-1}$				1.0060699
				(0.655)
HLTHEXP				.93227448**
				(0.043)
$HLTHEXP_{-1}$				.975106
				(0.360)
ECONEXP				1.0135298
				(0.169)
$ECONEXP_{-1}$				1.0072862
				(0.617)
TAX	.0047506***	.0066872***	.0041407***	.0014046
	(0.000)	*(0.000)*	*(0.000)*	*(0.503)*
TAX_{-1}	.0015185	.0012105	.0027553**	.0028994*
	(0.213)	*(0.473)*	*(0.031)*	*(0.077)*
GRANTS	1.0030044	1.003739	1.0033745	.99852459
	(0.196)	*(0.144)*	*(0.143)*	*(0.729)*
$GRANTS_{-1}$	1.0014874	.99940428	1.0016502	1.0002455
	(0.486)	*(0.812)*	*(0.400)*	*(0.942)*
Observations	55	49	52	39
Number of Countries	23	20	22	17
Wald Test of joint Significance	0.0000	0.0000	0.0000	0.0000
Test of serial autocorrelation				
First order (m1)	0.0833	0.0254	0.0773	0.0620
Second order (m2)	0.3475	0.3077	0.6905	0.4201

- *, **, *** denote significance at 10, 5, and 1 percent respectively
- The values in parentheses under the coefficients are P-values
- The number of observations and countries differs across models due to the lack of availability of data for some explanatory variables for some of the countries we have included in our sample.

Column (1) reports the results for the preferred model specification on the effect of total fiscal deficits on economic growth. Column (2) reports the results for the preferred specification on the effect of the alternative ways of deficit financing on growth. Column (3) reports the results for the preferred specification concerning the effect of current and capital expenditure on growth. Finally, column (4) reports the results for the preferred specification on the effect of government functional expenditure on growth.

Analysis of the estimated coefficients for the control variables shows mixed results. Some of the results are broadly consistent with the literature. For instance, there is some evidence of the presence of conditional convergence, indicated by the negative and statistically significant value of the estimated coefficient on the initial income variable. In addition, the results for the estimated coefficients for the investment and degree of financial deepening variables suggest that these variables had the expected positive and statistically significant impact on economic growth. Other results, however, are not entirely in support of the literature. For example, the result for the openness variable suggests that a higher degree of openness was positively associated with higher economic growth as expected, although the statistical evidence is not entirely conclusive and robust. Also, the results show that - contrary to the standard notion - inflation had a significant positive effect on growth with a lag, a finding that suggests that inflation was helpful rather than harmful to economic growth in studied sample of developing countries during the study period.

In relation to other control variables, the results suggest that population growth exerted a significant positive effect on economic growth in the short-run, while grants, although entering all model estimations with the expected positive sign, did not have any significant effect on economic growth in the considered sample of developing countries during the study period. Finally, the estimated coefficients on tax revenue, although positive in sign in all model estimations, were not entirely robust.

These results for the control variables are further explained and discussed in a more detail below.

(i) Initial Income

The estimated coefficient on the initial income variable (GDP_{-1}) is consistently negative and statistically significant in all four cases, suggesting that the sample of developing countries considered in our study experienced *conditional convergence* during the period 1972-2001. Conditional convergence refers to the tendency for initially poor economies to grow systematically more quickly than the initially richer economies once a set of other conditioning factors has been controlled for (Roberts, 2006; Barro and Sala-i-Martin, 2004, and Sala-i-Martin, 1996). Literature on economic growth and convergence shows that a negative coefficient on the initial income variable, when other appropriate additional explanatory variables are included in the growth regression equation, suggests conditional convergence (Quah, 1995; Estrada *et al*., 2015). It should be noted that our estimated coefficient on the initial income that ranges between -0.47 to -0.52 compares well with those reported in the studies by Hopper and Marquez (1995) and Roberts (1999) who estimated it to be around -0.43 and those by Bairam (1987) and McCombie and Thirlwall (1994) who found it to be about -0.50.

(ii) Investment

Our results on the investment variable (INV) are very consistent with the literature. The coefficient estimate of this variable is consistently positive and strongly significant in all four scenarios, which suggests that investment was a very important determinant of economic growth in the studied group of developing countries during the sample period. This finding is very much in line with predictions of economic theory that investment is an important determinant of economic growth. This finding in terms of the importance of investment in economic growth is also in line with the empirical results obtained in many studies on the relationship between investment and economic growth such as Anderson (1990), Khan and Reinhart (1990), Chow (1993), Patnaik and Chandrasekhar (1996), Anwer and Sampath (1999), Zhang (2003), among others.

(iii) Financial Deepening

The estimated coefficient of the proxy for financial deepening (M2) is consistently positive in both the current and the one-lagged periods, but statistically significant in the current period only. This suggests that financial sector deepening exerted an instantaneous positive effect on economic growth in the sample of developing countries considered in this study, although this effect tended to disappear after a short period[58]. The finding that financial sector deepening does contribute to economic growth is consistent with the standard conventional wisdom and much of the evidence on financial development that it enhances economic growth. This finding is in line with the with the findings obtained in the empirical studies by King and Levine (1993), De Gregorio and Guidotti (1995), Levine (1997, 2005), Arestis and Demetriades (1997), Levine *et al*. (2000), Beck *et al*. (2000), Ghirmay (2004), Antony and Tajudeen (2010), Cihak *et al*. (2012), Estrada *et al*. (2015), Ghildiyal *et al*. (2015) – among others, who report a positive and significant effect of various indicators of financial deepening on economic growth. However, there are also a number of empirical studies (such as Ram, 1999; Andersen and Tap, 2003; Rousseau and Watchel, 2005; among others) that find the effect of financial deepening on economic growth to be weak. On the other hand, some studies (for example, Kaminsky and Reinhart, 1999; Demirgue-Kunt and Detragiache, 1999; Rousseau and Wachtel, 2011; Gennaioli *et al*., 2012; Sahay *et al*., 2015) even find that financial sector deepening, especially rapid and excessive financial deepening in an environment that lack satisfactory legal or regulatory infrastructure to exploit financial sector development successfully or financial deepening that is associated with rather too rapid growth of credit, can lead to financial crisis - which in turn can result in a serious negative effect on economic growth.

[58] It is interesting to note that this finding is consistent with the findings in a number of studies on the effectiveness of fiscal and monetary policy using the St. Louis framework we reviewed in Chapter Three. Recall that a number of these studies reported that the impact of M2 (as a ratio of GNP or GDP, and which is used as a proxy of monetary policy in these studies) on economic growth is positive and instantaneous, although this impact tends to disappear quickly.

(iv) Openness

The results on the estimated coefficients on the degree of openness variable (OPEN) suggest that openness exerted a positive effect on economic growth in the sample of developing countries considered in our study, although the statistical evidence is not entirely conclusive and robust. The estimated coefficient of this variable in the short run, although exhibiting the expected positive in sign in all four scenarios, was not statistically different from zero in one scenario. On the other hand, the results on the estimated coefficient of the variable in the one-lagged period shows that, although positive in all four scenarios, they were not statistically significant in all cases.

A number of factors could probably explain our inconclusive and non-robust results on the effect of openness on economic growth in the sample of developing countries considered in this study. First, most of the developing countries followed protectionist trade policies for a significant part of our study's sample period, 1970s to mid-1980s or early-1990s. This point is also raised in Ulasan (2012) who argue that lack of conclusive evidence on the openness-growth connection in developing countries could be partly explained by the fact that substantial part of the studies on this issue use data that cover the pre-economic reforms of mid-1980s or early-1990s period when most of the developing countries followed protectionist trade policies.

Second, dependence by most of the developing countries on the exports of primary commodities which tend to face cyclical price collapses and low-elasticity of demand (Prebisch, 1950; Shafaeddin, 2005; Baldwin, 2008) and therefore making expansion of their production and exports less attractive. In addition, exports of primary agricultural commodities from these countries have for many years been affected by the support many of the developed countries provide to their agricultural producers through a number of policy measures, such as tariffs that discriminate against agricultural imports and subsidies that lower production costs and encourage greater production (Tokarick, 2003; Fenira, 2015). In fact, these agricultural support policies in developed countries have often been cited as one of the major reasons many developing countries have failed to achieve rapid expansion of their agricultural exports (Fenira, 2015, p. 478).

Third, weak contribution of openness to growth in developing countries can also be explained by failure by many of these countries to gain productivity growth through international trade due to the lack of complementary inputs (such as appropriate skills levels and enough capital intensities) these countries need in order to be able to adapt goods and new techniques invented in more technologically advanced countries (Basu and Weil, 1998; Acemoglu, and Zilibotti, 2001; Andersen and Babula, 2008; Sakyi *et al*., 2012)[59]. In fact, some empirical studies such as Dowrick and Golley (2004), Kim and Lin (2009) and Kim (2011) have suggested that trade openness has benefited developed countries more than developing countries due to inability of the developing countries to increase productivity growth by taking

[59] Note that productivity growth has been identified in the literature as one of the channels though which openness can enhance economic growth (see Andersen and Babula, 2008).

advantage of knowledge accumulation and technology spillovers, even though there are no barriers to the diffusion of technology.

Fourth, our mixed results on the degree of openness variable may also be an indication that the results are somewhat sensitive to different model specifications and the set of countries picked up during model estimations.

It is worth noting, however, that our inconclusive and non-robust results in relation to the effect of openness on economic growth are not new. In this regard, note that whether openness has any significant effect on economic growth in developing countries remains very much an unresolved question in the empirical literature. On one hand, one set of empirical studies (such as Sachs and Warner, 1995; Sinha and Sinha, 1996; Edwards, 1998; Yanikkaya, 2003; Mbabazi *et al*., 2006; among others) find openness to be positively and strongly associated with economic growth in developing countries. On the other hand, another set of studies such as Rodriguez and Rodrik (2001), Brunner (2003), Sarkar (2007) and Fenira (2015), among others, find very little evidence that openness is significantly associated with economic growth in developing countries, when other factors are controlled for. While differences with regard to the definitions and measures of openness, model specifications and econometric techniques used, time-period and sample of countries studied could explain the lack of consensus in the empirical literature on this issue (Greenaway *et al*., 2002; Sakyi *et al*., 2012), these mixed results also shows that a definitive evidence on the impact of openness on economic growth, particularly for developing countries, is not yet known.

(v) Population Growth

The coefficient estimate on the population growth variable (POP) is uniformly positive and significant especially in the short-run. As pointed out earlier, the population growth variable is commonly included in the empirical growth models as a proxy for labour force growth. Furthermore, as Nelson and Singh (1994), citing Feder (1983), points out, population growth can also be included as an explanatory variable in empirical growth models to ascertain if there exists a labour surplus situation, and if such a situation exists, whether it hurts or helps economic growth in developing countries (p. 170)[60]. Hence, our finding of a consistently positive and significant effect of population growth variable in the short run may be taken as an indication that labour surplus situation was not the general case for the sample countries in the period under investigation, at least in the short run, and that output grew in response to additional labour inputs.[61]

Our finding supports what is known as a revisionism viewpoint in literature, which suggests that population growth positively, contribute to economic growth (Darrat and Al-Yousif, 1999). According to this viewpoint, there are at least three channels through which population growth can stimulates economic growth. First, population growth increases the size of the labour force available to produce and

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[60] In turn, Nelson and Singh (1994) include population growth for this reason as an explanatory variable in their study "The Deficit-Growth Connection: Some Recent Evidence from Developing countries". Other empirical studies on economic growth for developing countries that use population growth variable for similar reason as an explanatory variable in their empirical models include, for example, Feder (1983), Singh (1985) and Singh (1992), among others.

[61] Note that this finding is consistent with that of Feder (1983) who found a positive and significant impact of population growth on economic growth for semi-industrialised economies during the period 1964-1973. It is, however, different from the finding by Nelson and Singh (1994) who report population growth to have had no significant impact on growth in a set of seventy developing countries over the period 1970-1989.

this will thus positively contribute to economic growth. In addition, an increase in the size of the labour force can help firms to produce based on the division of labour and specialisation, which will also most likely increase productivity and therefore the level of output. Second, population growth increases the market size for goods and services and this pushes firms to use available resources more efficiently and/or innovate in order to meet the increased market-demand. Efficiency in use of resources and innovation in turn leads to economic growth. Third, population growth is likely to pressurise governments to develop infrastructure (such as transport and communication, schools and hospitals, etc.), something which will most likely boost economic growth and development (Boserup, 1965, Simon, 1987, Darrat and Al-Yousif, 1999; among others).

However, it is important to mention that the finding that population growth stimulated growth in our sample countries in the period under investigation goes against the popular prediction in the growth theory literature that population growth is detrimental to economic growth.[62] Although, this theoretical prediction that population growth is harmful to economic growth is also not yet well supported empirically (Temple, 1999 p. 142). In an attempt to explain lack of definitive empirical support to this theoretical prediction, Kelley (1988) argues that some public policies are likely to exacerbate the 'expected' negative effects of population growth. Thus, taking into account that empirical model estimation in this study controls for various aspects of public policy, perhaps we can rule out, at least to some extent, the possibility that the 'expected' negative effect of

[62] The key papers in this literature are Malthus (1798) and Solow (1956).

population growth on economic growth is made stronger by such public policies. Moreover, it is argued in the literature that the 'expected' small negative effect of labour force growth on economic growth is partially mediated changes in labour force participation (Brander and Dowrick, 1994; Pritchett, 1996; Temple, 1999). On this basis, therefore, we also suspect that actual changes in labour composition and participation in developing countries may be one of the reasons for our finding of significant positive effect of population growth on economic growth.

(vi) Inflation

The coefficient estimates for the inflation variable suggest that, while inflation appears to have had a weak impact on economic growth in the short run, it had a positive and significant impact on growth with a lag. This suggests that moderate inflation of between 8 – 17 percent on average (see Table 5.7) that our sample of developing countries experienced during the study period was positively rather than negatively related with growth especially in the long term. While these results provide evidence in support of the structuralists view that inflation is essential for economic growth (Mallik and Chowdhury, 2001; Hussain and Malik, 2011), they are contrary to the general theoretical prediction and common belief that inflation impedes economic growth.

While these results appear somewhat surprising given the level of inflation experienced in this set of countries during the study period, they are in line with several other empirical studies such as Tobin (1965), Hess and Morris (1996), Shi

(1999), Mallik and Chowdhury (2001), Hussain and Malik (2011), among others, that also find inflation to have a positive and significant effect on economic growth.[63]

Furthermore, the results are consistent with a number of existing empirical studies that find 'moderate' inflation to be positively associated with growth (See for example, Khan and Senhadji, 2001; Gillman *et al*., 2002; Drukker *et al*., 2005; Kremer *et al*., 2009; Bick, 2010; among others). Although these studies also suggest that this 'moderate' inflation can positively influence economic growth only until a certain threshold level beyond which it starts to impede growth. Most of these studies report varied threshold levels for developed and developing countries. For example, Khan and Senhadji (2001) report the threshold of between 1 - 3 percent for developed countries and 11 - 12 percent for developing countries. Gillman *et al*. (2002) find the threshold points of 1 percent for developed countries and 11 percent for developing countries. Drukker *et al*. (2005) find the threshold of about 19 percent for a mixed sample of developed and developing countries, but different thresholds points of about 3 percent and 13 percent for developed and developing countries, respectively. Kremer *et al*. (2009) estimate the threshold of 2 percent for developed countries and 17 percent for developed countries. Bick (2010) finds the threshold of about 12 percent for developed countries and 19 percent for developing countries.[64]

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[63] On the other hand, however, it worth pointing out that our results are in sharp contrast to the ones obtained in several other studies on developing countries. For example, the study by Nelson and Singh (1994) finds that inflation had a negative and significant impact on growth in a set of seventy developing countries during the period 1970-1979.[63] In addition, the studies by Easterly *et al*., (1997) and Calderon & Serven (2003) find inflation to be a deterrent to economic growth for a number of Latin-American countries.

[64] In other similar studies on the issue, Bruno (1995) and Bruno and Easterly (1998) find that economic growth on average increased as inflation rates rose from negative or low rates to about 20 – 25 percent threshold level for 127 countries using data for the period 1960-1992. Pollin and Zhu (2005) find that inflation is associated with some gains in GDP growth up to about 15 - 18 percent

While our study does not estimate a 'growth-maximising' or a 'threshold' rate of inflation for the sample of countries under investigation[65], the threshold levels of inflation reported in the studies reviewed above shows that the level of inflation experienced, on average, in the sample of developing countries considered in our study was well within the range that several other studies have found inflation to be positively related with growth in developing countries.

(vii) Other Variables

Turning briefly to the variables that entered our empirical model under the consideration of the government budget constraint, the results on the effect of taxation (TAX) on economic growth are inconclusive. As depicted in Table 6.6, the estimated coefficient of this variable, although consistently positive in sign in all scenarios in the short run, it was statistically significant in three out of four cases, with the insignificant estimate being the one with least number of observations (39 observations) and countries (17 countries). The results also show that tax was positively and significantly associated with growth with a lag in two cases only, while in the other two cases it was not significant.

These mixed results on the tax revenue variable may be an indication of the point we raised earlier that the results are somewhat sensitive to different model

inflation threshold for a cross-country study of 80 developed and developing countries. Baglan and Yoldas (2014) find that inflation enhances growth only up to a threshold point of 12 percent using data on a panel of 92 developing countries.

[65] We do not perform this estimation as it is beyond the scope and focus of our study. Besides, as Ghosh and Phillips (1998 p.41) point out, such rate might be expected to somewhat differ across countries.

specifications and the set of countries picked up during model estimations. Also, we suspect that these mixed results on the tax revenue variable could a data quality and availability issue as significant amount of data for this variable for a number of countries and over a period of time was missing from the sources we used to collect data. Based on these mixed results of this variable, together with these data quality and availability issues, therefore, we are reluctant to draw any conclusive or definitive inference with respect to the effect of taxation on economic growth.

Finally, the results on the grants variable (GRANTS) shows that, although this variable enters the model with the expected positive sign in all four scenarios, it did not have any statistically significant effect on economic growth in the sample of developing countries considered in this study. This finding supports the main finding in a number of recent empirical studies on this issue (Hansen and Tarp, 2001; Easterly, 2003; Easterly *et al*., 2004; Roodman, 2007; Rajan and Subramanian, 2005 – among others) that aid has been ineffective in promoting economic growth in developing countries. Most of these studies come to this conclusion even after controlling for 'good policy environment', which the earlier and most influential study by Burnside and Dollar (2000) suggested to be an important determinant for the aid to have robust positive effect on economic growth.

Following Burnside and Dollar (2000), most of these studies use some key indicators of macroeconomic policy (such as budget surplus/deficit relative to GDP, inflation and trade openness, etc.) to construct a 'policy index' variable which is then included in the estimated empirical models to capture the impact of 'good policy environment (Hansen and Tarp, 2001; Easterly, 2003). While we do not construct and use this policy index variable in our empirical model because of the lack of enough information needed in order construct this policy index, we believe that, by controlling for most of these macroeconomic variables in our study, we are able to capture, at least to some extent, this expected impact of 'policy environment'. It is also possible that the expected growth effect of aid in a good policy environment is captured by interaction of aid variable with other of the economic policy explanatory variables in the model (Burnside and Dollar, 2000; Hansen and Tarp, 2001; Easterly, 2003). However, the effect of interaction between variables are not considered here due to data quality and availability issue.

Following the finding and conclusion of the work by Burnside and Dollar (2000) that aid promotes economic growth in a 'good policy environment' a number of economists and international development agencies have argued that aid will have no effective impact of growth when it is coincided with poor economic policies, corruption and poor governance (Burnside and Dollar, 2000; DFID and HM Treasury, 2002; CIDA, 2002; Wolfensohn, 2002). For example, in the words of the former president of the World Bank, James Wolfensohn (2002), quoted in Easterly (2003):

> *"We have learned that corruption, bad policies and weak governance will make aid ineffective." (Easterly, 2003: p. 25: citing James Wolfensohn at a speech during the U.N conference on "Financing for Development held in Monterrey, Mexico, in March 2002, in which cited a number of lessons learned by the international aid community, in World Bank, 2002)*

In light of this argument, therefore, one can argue that our insignificant results on the impact of grants on economic growth may also be explained by the possibility that government spending, part of which is financed by grants, in most developing countries was most probably coincided with poor economic policies, corruption and poor governance during the sample period considered in this study (Nelson and Singh, 1994; World Bank, 2000).

To summarise this discussion on the results on the control variables, coefficient estimates on these variables show mixed results. Results for some of the control variables are broadly consistent with the literature, meaning that these variables were important in explaining economic growth in developing countries. Others, although exhibiting the expected signs, are statistically insignificant. On the other hand, others are inconclusive. These results have some important policy implications for developing countries – which are discussed later in Chapter Seven.

6.7 Analysis of Regional Differences

As pointed out earlier in Chapter One, existing empirical studies on the deficit-growth connection in developing countries (such as Nelson and Singh, 1994; Adam and Bevan, 2005) provide results based on the analysis of data pooled from large samples of developing countries. Similarly, our regression results in sections 6.3 to 6.5 above have been based on the analyses of data pooled from a group of thirty-one developing countries. However, economic characteristics of the set of countries from different regions considered in these studies (including ours) are potentially different, hence making generalisation of the results based on the data pooled in this way potentially unreliable and misleading. On this basis, therefore, it seems more appropriate to analyse whether regional differences are important (or not) in our model estimation, before we can generalise our results for all the developing countries.

This section considers this by including three regional dummies in each of the models we analysed in sections 6.3 to 6.5 above. These dummies are for the following regions represented in our data set: South Asia and the Pacific (SAP), Latin America and the Caribbean (LAC), and Sub-Saharan Africa (SSA). Inclusion of the dummies, however, makes it practically difficult to apply the GMM technique in the model estimation since its first-differencing procedure would wipe out all the regional dummies. Thus, we choose to estimate all our models in this section using the ordinary least squares (OLS) technique.

Note that - as we discussed in Chapter Four (section 4.6) – the OLS method is likely to produce biased estimates for a dynamic growth model like ours since in this kind of model the unobserved country-specific effects are likely to be correlated with the lagged dependent variable – which is one of the explanatory variables. Despite this limitation, we believe that the results based on this technique can still be informative in analysing whether the regional differences are important in our model.

Turning to the regression results, Table 6.7 below summarises the results for the different versions of our model.

Table 6.7 Results on the effect of fiscal deficit on economic growth with regional dummies

Independent variables	(1)	(2)	(3)	(4)	(5)
GDP_{-1}		.0672494	.0726896	.0407691	-.1670152
		(0.650)	*(0.632)*	*(0.781)*	*(0.350)*
POP		.0044882	.0050823	.0053617	.0048253
		(0.335)	*(0.289)*	*(0.265)*	*(0.457)*
INFL		1.0013233	1.0001671	1.0003177	.9982715
		(0.646)	*(0.962)*	*(0.926)*	*(0.661)*
INV		1.041769***	1.0457191***	1.0376011***	1.045099**
		(0.002)	*(0.000)*	*(0.007)*	*(0.010)*
OPEN		1.0021175	1.0025763	1.0012155	1.0094234
		(0.762)	*(0.744)*	*(0.877)*	*(0.331)*
M2		1.0022411	1.0003101	1.0048889	1.0045409
		(0.778)	*(0.970)*	*(0.595)*	*(0.669)*
DFCT		-.0002494		-.0001056	-.0001911
		(0.770)		*(0.911)*	*(0.830)*
DFIN			1.0006403		
			(0.523)		
EXTFIN			.99863973		
			(0.400)		
GOVEXP		.96498078**	.96666691**		
		(0.017)	*(0.028)*		
CURREXP				.96423562**	
				(0.020)	
CAPEXP				.99468866	
				(0.416)	
PSEXP					1.0010705
					(0.873)
DEFEXP					.99727741
					(0.594)
EDUEXP					.99875837
					(0.866)
HLTHEXP					.97624197**
					(0.025)
ECONEXP					.99568404
					(0.597)
TAX		.0012504	.0009557	.0016266*	.0015985
		(0.146)	*(0.245)*	*(0.079)*	*(0.220)*
GRANTS		1.0027165	1.0032923	1.0029595	1.0006869
		(0.243)	*(0.157)*	*(0.226)*	*(0.777)*
AP	.0067459	.0031285	-.0013469	.0045451	.0157644
	(0.243)	*(0.740)*	*(0.888)*	*(0.653)*	*(0.123)*
LAC	-.009781	-.0119894	-.0116092	-.0109482	.011122
	(0.197)	*(0.217)*	*(0.254)*	*(0.325)*	*(0.443)*
SSA	-.0100231	-.0094364	-.0093857	-.0085311	.0102713
	(0.110)	*(0.227)*	*(0.265)*	*(0.354)*	*(0.308)*
Constant	.0463673***	.98422918	.98052062	.98596916	.84561086***
	(0.000)	*(0.696)*	*(0.652)*	*(0.742)*	*(0.007)*
Observations	184	110	104	105	85
Number of Countries	31	31	31	31	31
Wald Test of joint Significance	0.0032	0.0000	0.0000	0.0000	0.0001
Adjusted R-square	0.0720	0.3293	0.3447	0.3346	0.3547

- *, **, *** denote significance at 10, 5, and 1 percent respectively
- The values in parentheses under the coefficients are P-values

Regression (1) estimates the impact of regional dummies only on economic growth. Regression (2) estimates the impact of total fiscal deficits on economic growth. In regression (3), the total fiscal deficits variable is replaced by two broad categories of deficit financing, namely domestic financing and external financing. In regression (4), total government expenditure is disaggregated into two economic classifications of government expenditure, capital expenditure and current expenditure. Finally, in regression (5), government expenditure is disaggregated according to the functional classification of government expenditure.

The results show that all three regional dummies are not statistically significant in all the five scenarios. These results imply that, while there were some differences between the four regions represented in our sample of 31 developing countries during the study period, these differences were not statistically significant. Note that these results are consistent with our tentative conclusions regarding regional differences given in Chapter Five and section 6.3 of this chapter.

6.8 Conclusion

This chapter has empirically investigated the impact of fiscal deficits on economic growth for a panel of thirty-one developing countries over the period 1972-2001. To do this, we estimated the growth model we developed in Chapter Four using the Arellano and Bond (1991) Generalised Methods of Moment (GMM) estimation technique. Four different versions of this growth model were estimated in order to test our key hypotheses on the impact of fiscal deficits on economic growth. The first version considered the effect of total fiscal deficits on economic growth. The second version considered the growth effects of the alternative ways of financing deficits. The third version estimated the effect of current and capital expenditures on growth. Lastly, the fourth version considered the effect of government sectoral spending on economic growth. Our main findings are as follows. *First*, fiscal deficits per se had no significant impact on economic growth in the context of developing countries. *Second*, domestic and external financing of the deficits affected growth negatively with a lag. *Third*, most of the components of government expenditure, including the standard candidates of productive expenditure such as capital expenditure and spending on education and economic services did not have any significant impact on economic growth. *Finally*, analysis of results on the control variables show that the panel of developing countries considered in this study experienced 'conditional convergence' during the study period. The results also show that investment and financial deepening exerted a significant positive effect on economic growth, as expected. Other results, however, are not entirely consistent with the literature. For example, the results for the degree of openness and tax revenue variables suggest that these were positively associated with economic growth, although the statistical evidence is not entirely robust. Grants had a positive but statistically insignificant effect on growth. In relation to other control variables, we find that population growth had a positive and statistically significant effect on growth in the short-run, while, contrary to the standard theoretical prediction, moderate inflation experienced by the set of developing countries considered in this study appears to have had no deterrent effect on economic growth in these countries during the study period.

Chapter Seven

DISCUSSION OF POLICY IMPLICATIONS

7.1 Introduction

The preceding chapter has examined empirically the impact of fiscal deficits on economic growth in developing countries. Based on the estimation of a growth model using a panel of thirty-one developing countries for the period 1972-2001, it has provided empirical evidence on the following key hypotheses on the relationship between fiscal deficits and economic growth in developing countries. *First*, fiscal deficits have a significant positive or negative impact on economic growth in developing countries. *Second*, the impact of fiscal deficits on growth depends on how the deficits are financed. *Third*, the composition of government expenditure matters in determining the impact of fiscal deficits on economic growth. The estimated empirical evidence has important policy implications for developing countries. This chapter, therefore, discusses some key policy implications of our empirical findings on the relationship between fiscal deficits and economic growth for developing countries, taking into consideration the current trends in economic policy in these countries.

To achieve this, the rest of the chapter is organised as follows. Section 7.2 discusses policy implications based on the estimated effect of fiscal deficits on economic growth. Section 7.3 considers the implications of the results on the effect of alternative ways of financing fiscal deficits on growth. Section 7.4 examines policy implications of the results on the composition of government expenditure and economic growth. Section 7.5 discusses the policy implications of the results on the other policy variables considered in our empirical model. Finally, Section 7.6 concludes.

7.2 Fiscal Deficits

Our empirical results on the deficit-growth link suggest that there is weak evidence that fiscal deficits per se had any significant positive or negative impact on economic growth in developing countries during the period 1972-2001. The estimated coefficients on the fiscal deficit variable, although negative in sign in most cases, were not statistically different from zero in all of our preferred model specifications. This means that the evidence at hand rejects our hypothesis that fiscal deficits had a significant positive or negative impact on economic growth in developing countries during the study period.

This finding has some important policy implications for developing countries. One important implication of our results is that while, on average, developing countries consistently pursued deficit spending policy during our study period (see Table 5.1), such fiscal policy did not necessarily promote or deter economic growth in these countries. This implies that fiscal deficits per se may not necessarily be good or bad for economic growth in the context of developing countries. What fiscal deficits are used for in an economy may be more important. For instance, as many studies have suggested, fiscal deficits associated with promotion of private investment or financing much needed public infrastructure in developing countries – such as schools, hospitals and transport infrastructure – may enhance economic growth, while deficits associated with wasteful spending will have little or no impact on economic growth. As we also discuss later in section 7.3 below, the impact of fiscal deficits on economic growth may also depend on how the deficits are financed. Clearly deficit financing that causes macroeconomic imbalance may well affect economic growth especially in the long term. For instance, where excessive foreign borrowing finances government budget deficits, the resulting debt financing obligations can create problems in the future, especially when deficit spending is not invested on productive activities that generate sufficiently high returns to meet the interest payments on the debt (Weiss, 1995). In this case, deficit spending will very likely cause debt problems in the long-term, which will in turn be harmful to economic growth.

On the basis of the discussion above, one possible explanation as to why deficit spending policy appears not to have promoted economic growth in developing countries during the study period is that government budget deficits in these countries might have coincided with wasteful public sector spending, poor governance and the existence of large and ineffective bureaucracies or other counterproductive economic policies. Indeed, deficit spending in an economy characterised with these types of economic inefficiencies may have little or no direct impact on economic growth, or may even have a strong negative impact on growth especially in the long term. As pointed out by Nelson and Singh (1994), some economists and policymakers have argued that deficit spending could be an effective fiscal policy tool to promote employment and economic growth in developing countries, given the existence of large amounts of unemployed and underemployed labour and other economic resources in these countries. However, for this to be achieved developing country governments need to ensure that deficit spending policy is associated with less wasteful public sector spending and that existing economic policies are conducive to economic growth.

The finding in our study that fiscal deficits did not retard economic growth in developing countries during the study period also challenges the emphasis that has been placed on developing countries, particularly since the 1980s, to cut the levels of fiscal deficits based on the argument that deficits may have contributed to poor growth performance in these countries. The evidence at hand does not suggest that this was the case. One may even argue that too much emphasis on reducing deficits in developing countries can merely result in reducing investment spending on much-needed infrastructure and other development projects in these countries, something that could result in worse economic growth performance.

Summing up the overall policy implications with respect to our results on the effect of fiscal deficits on economic growth in developing countries, the evidence at hand suggests that fiscal deficits per se did not harm or promote economic growth in these countries during the period 1970-2001. What this means is that factors other than fiscal deficits per se may play a more important role in influencing economic growth in developing countries. We look at and discuss some of these factors in the next sections.

7.3 Deficit Financing

Our results on the deficit financing variables reveal that, while neither means of deficit financing, i.e., domestic financing and foreign financing, have any contemporaneous significant effect on economic growth, their five-year lagged effect on growth was negative and statistically significant. This means that both domestic and foreign financing had a negative effect on economic growth in developing countries with a lag. This finding is important; for, it implies that while fiscal deficits per se may not have any significant effect on growth in developing countries, how the deficit is financed matters in explaining their economic growth impact. As pointed out earlier in section 6.4, these contradictory results between the growth impact of total fiscal deficits and the ways the deficits are financed look somewhat surprising, but further investigation of the results suggest that this may be a data quality issue or the fact that we employ different sample sizes in our estimations considering the two issues[66].

The long-term negative effect of both domestic and foreign financing of the government budget deficit on economic growth could be associated with the potential macroeconomic imbalances associated with the various forms of deficit financing we discussed in Chapter Two (see section 2.5). Printing money to finance a deficit can cause inflation, drawing down foreign exchange reserves can provoke capital flight and therefore cause balance of payments problems, domestic

[66] Recall that we employ a smaller sample (only 20 countries and 49 observations) in estimating the effects of the alternative ways of financing deficits on growth than the one we employ in estimating the impact of overall fiscal deficits on growth (23 countries and 55 observations).

borrowing may push up interest rates and crowd out private investment, and foreign borrowing may result in unsustainable levels of external debt. Indeed, all these potential macroeconomic effects of the alternative ways of financing deficits can cause detrimental effects on economic growth, especially in the long run. The potential macroeconomic consequences of domestic and external financing in the context of developing countries are discussed in more detail below:

(i) Domestic Financing

Domestic financing can be raised using the following three forms: printing money (also known as monetisation of the deficit), drawing down foreign exchange reserves, and domestic borrowing.

Printing money is undertaken by increasing the supply of base money (also known as high-powered money) from the central bank in order to cover a gap between total government expenditure and revenue.[67] In general, it is accepted that government can raise some revenue to finance a deficit by printing money without causing any inflation when, in response to the resulting real output growth (if any), the private sector also increases its demand for money. However, if the monetary growth due to money printing is higher than the demand for money (i.e., the level of money the private sector wishes to hold) at the current price level some inflation will occur.

[67] Note that the definition of the public sector in this case excluded the central bank.

The amount of non-inflationary revenue (also known as seignorage) from the money printing exercise to finance the budget deficit is determined by the real growth rate of the economy, the ratio of base money to national income, and the income elasticity of the demand for real balances (Fischer and Easterly, 1990; Weiss, 1995; Agenor, 2004). Generally, assuming a given level for the income elasticity of the demand for real balances and a ratio of base money to national income, the amount of revenue from seignorage that the government can raise from money printing will be higher the higher the real growth rate of the economy, and vice versa. This means that countries with higher real economic growth rate will have more room to finance public sector deficits by using revenue from seignorage than those experiencing lower real economic growth rates. According to Fischer (1982), Fisher and Easterly (1990) and Weiss (1995), on average, the maximum rate of seignorage for developing countries has been estimated to be around 2.5 percent of GNP.

Drawing down foreign exchange reserves can help countries to cover the budget deficit without causing inflation. However, as we discussed in Chapter Two, this source of deficit financing is very limited for developing countries since the foreign exchange reserves of most of these countries are generally too low to finance deficit spending for a long period of time (Weiss, 1995). Another limitation of this form of deficit financing is that the excessive use of international reserves can lead to speculative pressure on the foreign exchange rate and provoke capital flight when the private sector is worried that foreign exchange reserves are about to be exhausted. Speculative pressure on the exchange rate and capital flight could in turn cause balance of payments problems, which will be detrimental to economic growth.

Another non-inflationary form of domestic financing of the deficit available to developing countries is the issuance of domestic debt – i.e. domestic borrowing. As we saw in Chapter Two, this form of deficit financing can take two forms. In countries where domestic capital markets are relatively developed, governments can sell short-term and long-term bonds that are purchased by the private sector voluntarily. However, in those countries where capital markets are underdeveloped or not existent, governments may use some forms of compulsory borrowing from the domestic financial institutions and the private sector. For example, government may force the private sector to buy its bonds in order to raise some revenue to cover the deficit, or the reserve requirements level may be increased to force domestic financial institutions to increase their deposits with the central bank at a zero or very low interest rate (Weiss, 1995). Excessive reliance on domestic borrowing, however, poses the risk of the public sector competing with the private sector for the limited financial resources available in the economy, hence putting pressure on domestic interest rates and crowding out private investment – something which may very well hurt economic growth. One can argue that this is very likely to happen in developing countries since these countries are generally characterised by low levels of domestic savings (Blejer and Ke-Young, 1989; Loayza *et at.*, 2000).[68]

[68] According to Blejer and Ke-Young (1989), some of the factors that cause low levels of domestic savings in developing countries are low rates of return to capital and the absence of well-functioning capital markets and institutions in most of these countries.

(ii) Foreign Financing

Where domestic capital markets are thin and domestic borrowing possibilities are limited, foreign borrowing can be an alternative source of financing public sector deficits (Fischer and Easterly, 1990; Weiss, 1995). This usually involves borrowing from the international development institutions, foreign governments and foreign capital markets (IMF'S GFS manuals – various issues). However, as Weiss (1995) argues, this source of financing is most useful for economies that are creditworthy. It follows therefore that many developing countries find it difficult to access foreign borrowing to finance deficits given the general perception that most of these countries are not creditworthy due to past over-borrowing and the high levels of debt that many of these countries have accumulated (Fischer and Easterly, 1990). Even where developing countries have access to this source of finance, in most cases, they are likely to face high interest rate charges due to their perceived low creditworthiness, and this in turn can lead to heavy future debt obligations with negative implications for long-term economic growth. Heavy debt obligations mean that, in the long-term, countries will be forced to allocate significant amounts of financial resources for debt servicing that would otherwise be available to finance investment spending on much needed infrastructure such as education, health, and transport and communication – and this may very well hurt their long-term economic growth. As pointed out earlier, heavy reliance on foreign borrowing to finance fiscal deficits will be particularly costly when the borrowed funds are not invested wisely in development projects that generate a sufficiently high rate of return in foreign exchange to meet the debt and interest payment obligations. In such cases, foreign borrowing will probably cause debt problems and hurt long-term economic growth. Debt crisis problems and the resulting poor growth performance that many developing countries faced during the 1980s provide a good example of how too much reliance on external borrowing to finance the budget deficit and inefficiency in the use of the borrowed funds can be very costly to the economy (Weiss, 1995).

To summarise the discussion on the policy implications related to deficit financing, empirical evidence shows that domestic and external financing of the budget deficit can both have a long-term negative effect on economic growth in developing countries. The transmission mechanism through which deficit financing can affect economic growth could be explained by the following macroeconomic imbalances associated with the alternative means of financing deficits. Monetisation of the deficits can be inflationary. Financing deficits using foreign exchange reserves can provoke capital flight and cause balance of payments problems. Domestic borrowing can put pressure on domestic interest rates and therefore crowd out the private sector, and excessive foreign borrowing can result in long-term debt problems. All these potential macroeconomic problems associated with the way fiscal deficits are financed can in turn hurt economic growth, especially in the long-term.

7.4 Composition of Government Expenditure

We have hypothesised in this study that what the deficit financing is used for in the economy matters in determining the effect of deficit spending policy on economic growth; fiscal deficits associated with "productive expenditure" will most likely promote economic growth in developing countries while fiscal deficits associated with "unproductive expenditure" will have little or no impact on economic growth. This raises the question, therefore, as to which components of government expenditure would be considered as productive expenditure and whether government expenditure associated with this type of spending has really been growth enhancing in these countries.

As discussed earlier, a commonly held view by many observers is that economic expenditure associated with capital investment on the one hand, and sectoral expenditure associated with health, education and, transport and communications on the other are positively associated with economic growth (Aschauer, 1989; Barro, 1991; Chu *et al*., 1995; Devarajan *et al*., 1996; Gupta *et al*., 1999). In fact, in light of this view, various international development institutions, donor agencies and NGOs have increasingly called for the developing countries to increase their expenditures in these areas (Gupta *et al*., 1999; Rajkumar, 2002).

However, our empirical results, as reported in the preceding chapter, show that most of the above-mentioned standard candidates for productive government expenditure, i.e., capital expenditure on the one hand, and sectoral spending on education and economic services on the other, had insignificant impact on economic growth in the sample of developing countries considered in this study. The coefficient estimates for all these variables, though positive, did not have a statistically significant effect on economic growth. The only categories that appear to have had a positive and significant impact on economic growth in our study are spending on health and general public services**.** Health expenditure had an immediate positive and significant impact on economic growth, while public service expenditure had a positive and significant impact on growth with a lag.

These results have important implications for policy. One important policy implication of our results is that deficit spending policy is less likely to promote economic growth in developing countries if most of the standard candidates of productive government expenditure have little or no impact on economic growth. In fact, our weak results on the relationship between the standard candidates of productive expenditure and economic growth could explain why fiscal deficits appear to have had no significant positive impact on economic growth in developing countries during the period 1972-2001.

Generally, it is difficult to draw policy conclusions that developing country governments should not allocate more resources towards the components of government expenditure that are normally considered productive - capital expenditure and sectoral spending on education, and transport and communication – despite our results that suggest weak impact of spending on these sectors on economic growth. However, these results do suggest that allocating more budgetary resources to these components of government expenditure may not necessarily guarantee high economic growth in developing countries. The finding that there is little or no significant relationship between the components of government expenditure which are normally considered productive and economic growth could be an indication that our study does not capture the true relationship between expenditure and growth due to the leakages in government spending when funds are not used properly on the intended productive activities. Note that, a unit's worth of government spending will not necessarily equal a unit's worth of public investment or service provision when there are some forms of leakages in government expenditure.

Ablo and Reinikka (1998) provide a good example of this scenario in their study that surveyed public spending in Uganda. As part of their study, they surveyed spending allocated for 250 primary schools and found that on average each of these schools received only 13 percent of their budgetary allocations for non-wage expenditure, with the remaining amount found to have disappeared or been used for purposes that were not related to primary school education. Clearly, using government spending figures on a case like this – as measured by government budgetary documents – to examine the link between government spending and development outcome will be misleading and will not capture the true relationship between the two.

The finding in our study that most of the standard candidates for productive expenditure seem not to have been associated with high economic growth in developing countries could also be an indication of inefficiencies in public spending in some developing countries due to poor quality of governance – measured by the level of corruption, quality of institutions, government effectiveness, among others (Kaufmann *et al*., 1999). A number of studies (such as Mauro, 1995, 1996, 1997, 1998; Ablo and Reinikka, 1998; Kaufmann *et al*., 1999; Rajkumaar and Swaroop, 2002; and, Ndikumana and Baliamoune-Lutz, 2008) have shown that quality of governance matters for development outcomes, including economic growth.

For example, using cross-section data for more than 150 countries, Kaufmann *et al*. (1999) provide empirical evidence showing that there is a strong positive causal relationship from quality of governance to development outcomes, including economic growth. This means that public sector spending programmes in countries with poor governance will most likely result in poor development outcomes, and vice versa.

Rajkumar and Swaroop (2002) have a similar point of view with regard to the relationship between quality of governance and development outcomes. They find that development outcomes of public spending will be generally poor in countries with high levels of corruption and inefficient bureaucracy. According to Rajkumar and Swaroop, merely allocating public funds to productive sectors like education and health may not lead to desirable development outcomes in countries with poor governance. These findings are particularly relevant for developing countries, where the state of governance is generally poor.

Ndikumana and Baliamoune-Lutz (2008) also point out that corruption undermines public investments and economic growth. They argue that corruption affects the quantity of productive public investment negatively by displacing funds from productive activities towards unproductive activities. They also argue that corruption causes inefficiency in public investments since it gives incentives to corrupt public officials to allocate funds to projects that generate higher private benefits – material or political – instead of projects that generate higher social benefits. Indeed, in this situation the development outcomes of government spending will be less than optimal. A number of empirical studies report findings in support of Ndikumana and Baliamoune-Lutz (2008) that corruption has a detrimental effect on economic growth. For example, studies by Mauro (1995, 1996, 1997 and 1998); Tanzi and Davood (2000); Tanzi (2002); Gyimah-Brempong (2002); and Ndikumana (2006) all find that, in general, countries with high levels of corruption tend to grow more slowly, and vice versa.

Unfortunately, as discussed earlier in Chapter Four (section 4.3), we have failed to include the governance variable in our empirical model due to the lack of data on this variable for the large part of our sample period for developing countries. However, based on the findings from the studies reviewed above, we argue that poor governance will most likely weaken the theoretically expected positive and significant impact of the standard candidates for productive expenditure. Thus, since many developing countries are characterised by poor governance performance it is not surprising to find that most of the components of government expenditure in these countries are not associated with growth. Government expenditure in these countries will not necessarily result in expected development outcomes – rather, it will result in wasteful allocation. This calls for institutional reforms to improve the quality of governance if government expenditure is to effectively lead to expected development outcomes – including economic growth – in developing countries.

Another possible explanation of our poor results for the growth effects of most components on government expenditure is that government spending in developing countries merely resulted in crowding out private sector spending during the study period. If this were the case, then one would argue that the likely effect of addition public sector spending, or increased deficit spending, on economic growth would be minimal.

7.5 Policy Implications of the Results for Other Variables

The above sections have discussed some policy implications of the results on the variables that are of particular interest in our study. This section in turn is devoted to the discussion of some policy implications of the results on other variables which we considered in our empirical model. These include the control variables – initial income, investment, degree of financial deepening, openness, population growth and inflation – and other variables that entered our empirical model under the consideration of the government budget constraint.

(i) Initial Income

The coefficient of the initial income variable (GDP_{-1}) is consistently negative and statistically significant in all of our preferred models. This implies that the group of countries considered in our study experienced the so-called "conditional convergence" during the period 1972-2001. However, these results have no great policy relevance – for, what is important for economies is not conditional convergence - the tendency for economies to grow faster the further they are from their own steady state level of output - but rather absolute convergence – the need for poor economies to grow faster regardless of their eventual steady state level of output.

(ii) Investment

In accordance with the existing large body of both theoretical and empirical literature on investment and economic growth (See for example Aschauer, 1989; Barro, 1991; Barro and Sala-i-Martin, 1992b; Mankiw, Romer and Weil, 1992), our study finds consistent evidence of a positive and strongly significant impact of investment on economic growth. This has a clear policy implication that investment is indeed an important engine of economic growth in developing countries. Consequently, governments in developing countries should take necessary measures to promote the level of investment in order to influence growth.

There are two ways developing country governments can increase the level of investment. First, by increasing the level of *public investment* in much needed infrastructure - such as education, health, and transport and communication. This can promote long-term economic growth directly by increasing the productive capacity of the economy or indirectly by increasing the productivity of private capital (Khan and Kumar, 1997). As Khan and Kumar (1997) further argues, some components of public investment may also be complementary to private investment, and in doing so, be beneficial to economic growth. However, it is worth noting that increasing public investment in infrastructure may not necessarily have a beneficial impact on private investment and growth if it crowds-out (substitutes) private investment rather than complementing it or when it is associated with inefficiency and wastage of resources as was discussed earlier.

Second and perhaps the more effective way developing country governments can increase aggregate investment is by taking measures to promote the level of *private investment*. According to the recent investment literature, these measures can include implementation of economic policies designed to achieve a stable macroeconomic environment, good governance, provision of satisfactory legal and institutional arrangements for the protection of property rights, development of infrastructure, improving access to credit by domestic investors, creation of an environment conducive to a low cost of doing business, and adequate political stability (Schmidt-Hebbel *et al*., 1994; Khan and Sumar, 1997). As a number of studies have shown (for example, Landau, 1983; Khan and Reinhart, 1990; Serven and Solimano, 1990; Coutinho and Gallo, 1991; Nelson and Singh, 1994; Khan and Kumar, 1997), this component of investment (private investment) can have even a larger positive impact on economic growth than public investment.

(iii) Financial Deepening

The degree of financial deepening is found to have a short-run positive and significant impact on economic growth in the sample of developing countries considered in this study. This finding has an important policy implication that financial deepening can play an important role in promoting economic growth in developing countries. Thus, as part of the efforts to enhance economic growth, policy-makers in developing countries should continue to implement and enhance financial sector reforms aiming at the creation and promotion of the deep and broad financial sector many developing-country governments have been pursuing over the past two or three decades. These reforms include measures such efforts to improve the growth of the real money supply, increasing the growth of banking sector, privatisation and liberalisation of the financial sector, creation and promotion of modern financial institutions, increasing the number of financial institutions and diversification of services, launching more financial products, increasing access to credit by the private sector and consumers, stock market developments, and improvement of financial intermediation (Thornton, 1996; Darrat, 1999; Ndebbio, 2004; Rousseau and Wachtel, 2011; Ghildiyal *et al.*, 2015). By developing a deep and well-functioning financial sector, countries can have more potential to enhance economic efficiency, create and expand liquidity, and promote investment, employment and economic growth. However, the recent financial crises (e.g., 1997 Asian Financial Crisis and 2007-2008 Global Financial Crisis) should offer some important lessons to countries that some of the ways of achieving financial deepening and broadening, particularly privatisation and liberalisation, should be matched with improvement in financial sector regulation in order to ensure financial and economic stability.

(iv) Openness

Although trade openness has become an important policy variable for developing countries over the past few decades, our study finds that its impact on economic growth in the sample of developing countries considered in our study is not entirely conclusive and very robust. While by no means these inconclusive and non-robust results on the openness-growth connection suggest that openness is not an important determinant of growth in developing countries, the results may serve as an indication that may be developing countries have not yet really benefited much from the trade openness measures[69] most of these countries have pursued in the last few decades. As argued earlier in Chapter Six, our results may also be an indication of the economic growth consequences of the protectionist trade policies most of the developing countries followed during the large part of our sample period, especially from the 1970s to mid-1980s or early-1990s (Ulasan, 2012) and the consequences of some of the structural issues in relation to developing country trade, such as heavy dependence on primary commodity exports which tend to face significant and regular price fluctuations and low-elasticity of demand (Prebisch, 1950; Shafaeddin, 2005; Baldwin, 2008) and lack of complementary inputs needed in order to gain productivity growth through international trade with more

[69] These include measures such as the liberalisation of trading system, reduction or removal of tariffs and non-tariffs barriers to trade, and signing of bilateral, regional and multilateral trade agreements with other countries around the world (Sakyi *et al*., 2012).

technologically advanced countries (Basu and Weil, 1998; Acemoglu, and Zilibotti, 2001; Andersen and Babula, 2012).

On this basis, therefore, it would appear that, for trade openness to enhance economic growth in developing countries, developing country governments also need to address these important structural issues as these countries continue to implement economic policy reforms in the areas of monetary policy, fiscal policy, and especially exchange rate and trade policy that aim to achieve greater openness to international trade.

Indeed, trade openness per se may not necessarily lead to high economic growth in developing countries if these structural issues are not addressed. In this regard, we argue that developing countries need to diversify their exports to reduce their over-dependence on primary commodity exports, which tend to face cyclical price collapses and low-elasticity of demand (Prebisch, 1950; Shafaeddin, 2005; Baldwin, 2008); problems which makes expansion of their production unattractive and not very beneficial in terms of earnings from exports. Note also that, as Baldwin (2008) further argues, some developing countries have generally experienced deteriorating terms of trade due to the decline in the prices of primary products (the primary exports of the developing countries) relative to the prices of manufactured products (primary exports of the developed countries).[70] This again shows the need for developing countries that still have heavy reliance on primary

[70] Note however that this argument may not entirely hold now for the general trends in the world trade shows that manufacturers have been falling in prices recently, and some developing countries, especially many developing countries in Asia, are now exporters of manufacturers (WTO, 1996).

commodity exports whose prices are more volatile than those of manufactured goods to diversify their exports in order to enhance the economic benefits of greater openness in these countries.

Developing countries also need to invest more in complementary inputs such as human capital and technology needed in order to be able to adapt goods or techniques invented in more technologically advanced countries. As argued in Andersen and Babula (2008, p.10), with high levels of human capital and technological know-how, developing countries can obtain productivity gains through access to technological innovations in developed countries. That way, new technologies designed to achieve higher productivity in developed countries may also lead to productivity growth in developing countries, through international trade.

Another issue that needs consideration is for developing countries to continue to engage the developed countries to reduce (and eventually remove) agricultural support policies that the rich countries provide to their agricultural producers, especially on the products that are of export interests to developing countries. As argued earlier in Chapter Six, several agricultural policy support measures such as tariffs that discriminate against agricultural imports and subsidies that encourage greater agricultural production offered in developed countries are often seen as detrimental to the developing countries' exports.

(v) Population Growth

Our results on population growth reveal that it had a positive and statistically significant impact on economic especially in the short run. The results therefore suggest that output grew in response to labour force growth in our sample of developing countries during the study period, and attempts to curtail population growth would have been unnecessary or perhaps even detrimental to the economic growth process. As mentioned earlier in Chapter Six, these results support the revisionism view on the population-growth link, which establishes that population growth stimulates economic growth through at least the following three channels. First, population growth increases the size of the labour force available to produce and this can lead to economic growth. In addition, increase in the availability of labour as a result of population growth can help firms to produce based on the division of labour and specialisation, something which can result in productivity growth, and therefore output and output growth. Second, population growth increases the market size for goods and services, and this pushes producers to use available resources more efficiently and/or produce using more innovative ways in order to meet the increased market demand. Efficiency in the use of economic resources and innovation in turn leads to economic growth. Third, population growth is likely to put pressure on governments to develop more infrastructure, and this increase in infrastructure can boost economic growth and development (Boserup, 1965, Simon, 1987, Darrat and Al-Yousif, 1999). Indeed, if this is true for developing countries, then population growth can have significant positive effect on economic growth.

Nevertheless, our results and policy implications on population growth should be taken with caution in that they are based on the relationship between population growth and *overall* economic growth rather than *per capita* economic growth. One would argue that what is more important in the population-economic growth link is the impact of population growth on per capita economic growth. Clearly, if the population growth rate is higher than overall economic growth then per capita income will fall and lead to a decrease in the standard of living. In addition, population growth can impede per capita economic growth through what is known in the literature as "capital dilution". This means that, assuming the amount of capital in an economy is constant, an increase in the population will lower the capital-labour ratio (the capital per worker), and this will affect per capita economic growth.

Another important issue to consider in terms of policy is the impact of population growth on development goals other than economic growth. For instance, many economists and policy makers are concerned that high population growth is associated with non-income development challenges such as environmental degradation and pressure on the provision and quality of public services like education and health (Temple, 1999; Todaro, 2007; Meier, 2007). These challenges are particularly relevant in developing countries in terms of policy on population growth.

(vi) Inflation

Contrary to the standard view, our empirical results suggest that inflation had a positive impact on economic growth in the sample of developing countries we considered in this study, especially in the long run. This finding has important policy implications for policymakers and development partners in developing countries. One important implication is that moderate inflation appears to be helpful rather than harmful to economic growth in developing countries. Another implication is that, contrary to the recent policy advice from development partners and international lending agencies especially the IMF, our results suggest that attempts to reduce inflation to a very low level[71] are likely to negatively affect economic growth in developing countries.

However, while our results are very much in line with the structuralist view on the relationship between inflation and economic growth, we argue that cautious approach to inflation is still needed since persistent higher inflation may trigger inflationary spirals beyond a safe level which is difficult to contain. In addition, countries should not be complacent and allow inflation rate which is beyond the 'threshold level of inflation' as discussed earlier in Chapter Six[72]. Clearly, while some inflation can be good for investment and economic growth (Barro, 1995; Bruno, 1995; Bruno and Easterly, 1998), economic policies and measures to maintain appropriate low to moderate and stable inflation can help developing countries to

[71] Note that the inflation-targeting policies as they have been recently being practised in developing countries targets to maintain inflation within a 3 – 5 percent band (Pollin and Zhu, 2005)

[72] Hence, the challenge for developing countries is to determine this 'threshold level of inflation' appropriate for their economies.

be competitive and achieve macroeconomic stability, both of which are crucial for growth.

(vii) Other Variables

Regarding the variables that entered our empirical model under the consideration of the government budget constraint, the results for tax revenue were somewhat mixed and inconclusive. As discussed in the previous chapter, the estimated coefficient of this variable, although consistently positive in sign in both the current and the lag periods, it was statistically significant in three out of four cases in the current period, while in the lag form it was significant in two cases only. Thus, given these mixed results of this study, we are reluctant to draw any definitive policy implications with regard to impact of taxation on economic growth in developing countries.

Finally, our results suggest that grants did not have any statistically significant effect on growth. These results have at least the following two implications. First, on average, the sample of developing countries we have considered in this study were not able to use development aid effectively to promote growth over the period 1972-2002. We argue that this failure to use aid effectively to foster economic growth in the studied sample of developing countries during this period could be due to the possibility that international development aid in most developing countries may have coincided with wasteful government spending, poor governance and other counterproductive economic policies as Nelson and Singh

(1994) and Burnside and Dollar (2000) point out. Second, it should be stressed that our results, which relate to the past, do not imply that international development aid cannot be beneficial in promoting growth in the future. Rather they do suggest that for international development aid to be effective in fostering economic growth in the future, there needs to be re-thinking on how aid is used more effectively and in good policy environment such that it enhances economic growth. This point supports efforts which are under way at both national and international levels to improve aid effectiveness (DFID and HM Treasury, 2002; CIDA, 2002; World Bank, 2002; Rajan and Subramanian, 2005 – among others).

7.6 Conclusion

This chapter has discussed the policy implications of our empirical results on the impact of fiscal deficits and other public policy variables on economic growth in developing countries. Our results reveal that fiscal deficits per se, the standard candidates of productive government expenditure and grants have exercised little or no impact on economic growth in developing countries. We suspect that these results could be explained by the conventional view that budget deficits, grants and government expenditure in general have coincided with wasteful public sector spending, poor governance and other counterproductive economic policies in many developing countries. Thus, we argue that governments need to cut wasteful spending, improve governance and pursue necessary economic policy reform in order to ensure that deficit spending, grants and government expenditure are used effectively to promote economic growth.

Deficit financing, on the other hand, seems to have a negative impact on economic growth with a lag. What this implies is that while deficits per se may not be good or bad for economic growth in the context of developing countries, how these deficits are covered could have an indirect detrimental impact on economic growth. This may be associated with the likely macroeconomic consequences of excessive financing of fiscal deficits. Printing money to finance a deficit can cause inflation; excessive use of foreign exchange reserves to finance the deficit can provoke capital flight and cause balance of payments problems; too much domestic borrowing may result in crowding out of the private sector; and, excessive borrowing from abroad may result in unsustainable levels of external debt.

With regard to the control variables, our empirical results have provided evidence that investment and financial deepening are positively and significantly associated with economic growth in developing countries. These results suggest that investment and financial deepening are key determinants of economic growth in developing countries. Policy-makers in these countries therefore need to formulate and implement economic policies aiming at promoting investment and financial deepening in order to promote economic growth. The degree of openness variable also enters the model with the expected positive sign, although the evidence is not entirely conclusive. Inflation appears to be positively associated with economic growth, results which are contrary to the conventional wisdom. Population growth has a positive and significant impact on economic growth, a finding that suggests that labour force growth promoted economic growth in developing countries during the study period (1972-2001). Grants appear to have no statistically significant impact on economic growth. Finally, the results on the tax revenue variable are mixed and provide inconclusive evidence.

Chapter Eight

SUMMARY AND CONCLUSION

8.1 Introduction

This chapter presents a summary and conclusion of this study. To do this, the chapter proceeds as follows. Section 8.2 presents the overall summary of the study. Section 8.3 summarises the main findings of the study and their policy implications. Section 8.4 discusses this study's contributions to knowledge. Section 8.5 discusses problems and limitations faced in the process of carrying out this study. Finally, Section 8.6 outlines potential areas for future research.

8.2 Summary of the Study

This study has examined the impact of fiscal deficits on economic growth in developing countries. The study was motivated by the ongoing debate on the effects of public sector deficits on economic performance. Since the Keynesian revolution, many economists and policy makers have argued that deficit spending policy could be one of the effective measures to fight the problems of unemployment and poor economic growth in industrialised countries during economic downturns. In the context of developing countries too, supporters of this viewpoint have argued that deficit spending would be a useful economic policy tool to promote economic growth in these countries, given the large amount of unemployed and underemployed labour and other economic resources that exist in most of these countries. On the other hand, however, other economists and policy makers argue that deficit spending has little or no effect on employment and economic growth, and that this policy primarily results in the re-distribution of resources from the private sector to the public sector. Proponents of this viewpoint also warn that fiscal deficits can cause some macroeconomic imbalances and that these imbalances can in turn lead to negative consequences to growth and employment, especially in the long term. In fact, this point of view has been associated with the macroeconomic reforms many developed and developing countries have pursued over the past few decades. In developing countries, in particular, as part of these reforms, governments have been advised to cut the levels of deficits as one of the measures to address the macroeconomic problems many economies have experienced over the past few decades. Despite this ongoing debate, however, there is still a lack of thorough empirical investigation on the effect of fiscal deficits on economic performance, especially in the context of developing countries. Hence the motivation of this study.

The study has looked specifically into the effect of fiscal deficits on economic growth in developing countries, using panel data from a sample of thirty-one countries for the period 1972-2001. The specific objectives of the study were three-fold: *one*, to empirically examine the impact of fiscal deficits on economic growth in developing countries; *two*, to examine whether there are any significant regional differences in terms of the relationship between fiscal deficits and economic growth in developing countries; and, *three*, to discuss the policy implications of the findings in relation to the first two objectives.

To address these research objectives, we started by critically reviewing the existing literature on fiscal deficits and its impact on economic growth in Chapters Two and Three. We then discussed the methodological framework used in this study to examine the impact of fiscal deficits on economic growth in developing countries in Chapter Four. This was followed by descriptive analysis of the trends in fiscal deficits, economic growth and control variables included in the empirical model used in this study to estimate the impact of fiscal deficits on economic growth in Chapter Five. In doing this, the chapter also examined whether there exist any significant regional differences in relation to the trends in fiscal deficits, economic growth and other economic variables within developing countries. Thereafter, Chapter Six presented empirical evidence on the impact of fiscal deficits on economic growth in developing countries, using data from a panel of thirty-one countries, and this was followed by discussion of some policy implications of the empirical results and key findings in Chapter Seven.

In the literature review, we considered both theoretical literature and empirical literature. Theoretical literature shows that there are three main perspectives regarding the impact of fiscal deficits on economic growth. The first is the well-known Keynesian perspective in which it is generally believed that well timed and used fiscal deficits can lead to higher levels of output, and therefore economic growth. The second is the Neo-classical perspective in which it is argued that deficit spending has little or no impact on growth, and that it primarily results in crowding out of private sector. Support for this viewpoint has also produced a growing concern that deficit spending can cause macroeconomic problems such as inflation, high interest rates and unsustainable levels of public debt – all of which can in turn hurt economic growth, especially in the long term. The third perspective is associated with the Ricardian analysis that deficits are irrelevant in the determination of macroeconomic performance, including economic growth. According to this viewpoint, fiscal deficits will have no real effect on aggregate demand, and therefore output and economic growth. Based on a critical examination of these viewpoints, however, we argue that the Ricardian perspective is based on unrealistic assumptions, especially in the context of developing countries, and therefore does not provide an acceptable approximation to reality in terms of the effect of fiscal deficits on economic growth. On this basis, therefore, we also argue that it is the Keynesian and Neo-classical perspectives that offer the most realistic starting point in the analysis of the deficit-economic growth connection, but with the two perspectives representing two different aspects of fiscal policy of short run and long run, respectively. Further analysis of the literature, however, shows that even the Keynesian and Neo-classical analyses of fiscal policy expansion mainly explains the economy's transitional growth rate while the steady-state growth rate remains unaffected – that is, it affects only the level of output and output growth in the short-run rather than the long-run growth rate. According to the literature, the impact of expansionary fiscal policy on the long-run growth rate of the economy can be explained using the endogenous growth models. Hence we argue that the Keynesian and Neo-classical perspectives together with the endogenous growth models provide the most relevant starting point for theoretical analysis of the impact of fiscal deficits on economic growth.

Empirical literature we reviewed shows mixed results. Some studies find that fiscal deficits have a positive and statistically significant effect on economic growth. Others find a negative and statistically significant relationship between fiscal deficits and economic growth. Yet other studies find that fiscal deficits have either a positive or a negative but statistically insignificant effect on economic growth. Assessment of the reviewed empirical studies suggest that these mixed results could be explained by various factors such as diversity in econometric specifications and estimation techniques used, differences in the measurements of variables considered in the studies, and the nature of the economies or sample countries considered in these studies.

Based on the critical review of both theoretical and empirical literature, we developed the following four key hypotheses regarding the impact of fiscal deficits on economic growth. *First*, fiscal deficits have a significant positive or negative impact on economic growth. *Second*, the impact of fiscal deficits on economic growth depends on the size of fiscal deficits as a percentage of GDP – that is, the relationship between the two is non-linear. *Third*, the impact of fiscal deficits on economic growth depends on how the deficits are financed. *Finally*, the impact of fiscal deficits on economic growth depends on what deficit financing is used for – in other words, it depends on the composition of government expenditure.

Based on the review of literature, we also formulated a regression model that is used in this study to test the above-mentioned hypotheses on the impact of fiscal deficits on economic growth using data from a sample of thirty-one developing countries over the period 1972-2001. The model is based on the theoretical framework we build following the review of literature on deficit-growth connection and the endogenous growth model along the lines of the model of government and economic growth due to Barro (1990), Sala-i-Martin (1990), and Barro and Sala-i-Martin (1992, 1995, 2004). In particular, the regression model expresses real GDP growth as a function of a vector consisting of the elements of government budget constraint (revenue, expenditure, and the deficit) and a vector consisting of a set of control variables that are usually included in the growth empirics. These control variables are an initial income variable, population growth rate (used as a proxy for the growth of labour supply), the level of investment, inflation rate, money supply (used as a proxy for financial deepening), and an indicator of the degree of openness.

Four versions of this model were estimated in order to test our key hypotheses. In the first version, we estimated the original model to examine the effect of fiscal deficits per se on economic growth. In the second version, we replaced the deficit variable by its sources of finance, namely domestic finance and external finance, to examine whether the impact of fiscal deficits on growth depends on how deficits are financed. In the third version, we disaggregated the total expenditure variable into two categories, capital expenditure and current expenditure, to check whether the impact of fiscal deficits on economic growth depends on the composition of government expenditure. Finally, in the fourth version, we disaggregated the total expenditure variable based on sectoral classification of government expenditure to check whether economic growth depends on the sectoral classification of government expenditure. Our argument in relation to the composition of government expenditure is that deficit spending on the components of government expenditure found to be 'productive' would be growth enhancing, while spending associated with the components of government expenditure found to be 'unproductive' would have little or no impact on economic growth.

The growth model was estimated using the Arellano and Bond (1991) GMM estimation technique. Many existing empirical studies on the topic have employed other estimation techniques, particularly ordinary least square (OLS) technique, fixed-effects technique and Random-effects technique. However, evidence shows that these techniques produce biased estimates when used to estimate dynamic models like ours. In addition, it is difficult to deal with the endogeneity problem which is associated with growth models like ours when these estimation techniques are used. Thus, we employ the Arellano and Bond GMM estimator to control for these problems.

8.3 Main Findings and Policy Implications

The study's main findings and their policy implications are summarised below:

- Fiscal deficits per se did not have any significant impact on economic growth in developing countries during the study period (1972-2001). This implies that fiscal deficits per se were not necessarily good or bad for economic growth in developing countries. Another implication is that, as some studies have suggested, deficit spending policy in developing countries might have coincided with wasteful government spending, poor governance and the existence of a large and ineffective bureaucracy, and other unproductive economic policies.

- Both domestic and external financing of the deficits had a negative impact on economic growth with a lag. This finding suggests that deficit financing in developing countries could be associated with macroeconomic problems which are likely to affect economic growth, especially in the long run. The literature shows that various ways of deficit financing could be potentially harmful to the economy; printing money to finance deficits could cause inflation, drawing down foreign exchange reserves could provoke capital flight and therefore cause balance of payments problems, domestic borrowing could push up interest rates and crowd-out private investment, and foreign borrowing could result in unsustainable levels of external debt. All these macroeconomic problems could be detrimental to economic growth, especially in the long run.

- Most of the components of government expenditure (including the standard candidates for 'productive' expenditure - such as capital expenditure and sectoral spending on education and economic services (which includes spending on transport and communication) - had little or no impact on economic growth in developing countries. The coefficient estimates for all these variables, though positive, were not statistically different from zero. This has an important policy implication that deficit financing associated with spending on these components of government expenditure will not have any significant positive effect on economic growth. These weak results on most of the components of government expenditure could explain why we find that fiscal deficits per se did not have any significant impact on economic growth in developing countries.

- The lagged dependent variable is found to have a negative and statistically significant impact on economic growth, which implies that the group of countries of countries considered in this study experienced the so-called conditional convergence during the period 1972-2001.

- The results on investment and financial deepening show that, as expected, these variables exerted a positive and significant effect on economic growth. These results imply that these variables are key determinants of economic growth in developing countries.

- The results show some evidence that openness had a positive impact on economic growth, although the statistical evidence is not entirely conclusive and robust. The results suggest that may be developing countries have not yet really benefited much from the trade openness policy most of these countries have pursued in the last few decades.

- On the other variables we include in our empirical model, we find some evidence that inflation was positively associated with economic growth, results which are contrary to the conventional wisdom. These results therefore imply that moderate inflation that the sample of developing countries considered in this study experienced on average had helpful rather than harmful effect economic effect in these countries, and that attempts to reduce inflation in these countries to a very low level may very likely reduce economic growth. Population growth appears to have had a positive and significant impact on economic growth, a finding that suggests that labour force growth promoted economic growth in developing countries during the study period (1972-2001). The results on the tax revenue variable are mixed and therefore provide no conclusive evidence or definitive inference on the effect of taxation on economic growth. Finally, grants appear to have had no expected positive significant impact on economic growth in the considered sample of developing countries.

8.4 Contribution to Knowledge

This study has contributed to knowledge on the relationship between fiscal deficits and economic growth in various ways. Some of the key contributions are summarised below:

First, it fills an important gap in the empirical literature on the relationship between fiscal deficits and economic growth in the developing countries. So far, most of the empirical studies on fiscal deficits and economic growth have been confined to developed countries, and there is a scarcity of such studies in the context of developing countries. Our study, therefore, fills this gap in the literature. In doing so, the study also offers important empirical findings which are useful for the public policy formulation in relation to fiscal policy in developing countries.

Second, while most of the existing empirical studies on the impact of fiscal deficits on economic growth consider the growth impact of fiscal deficits per se, this study goes further and looks into *how the alternative ways of deficit financing* and *the composition of government expenditure* may play an important role in determining the impact of deficits on economic growth.

Third, most of the empirical studies on the topic consider only the contemporaneous effects of fiscal deficits on economic growth. This study considers both the contemporaneous and lagged effects on growth of fiscal deficits and other variables for which theory and intuition suggest that they are likely to influence economic growth with a lag. Our approach is more appropriate since fiscal policy variables and other variables which are normally included in the growth models, like the one we used in our study, are expected to influence economic growth with some time lag.

Fourth, a number of earlier empirical studies on fiscal deficits and economic growth, especially those published before the mid-1990s, fail to consider the implications of the government budget constraint carefully in their estimations. These studies are likely to suffer from substantial biases in the coefficient estimates due to model misspecification. Our study treats the government budget constraint carefully, and in doing so, it avoids the model specification problems and therefore possible bias in the results caused by failure to include the government budget constraint in the econometric model.

Fifth, the study employs the GMM estimation technique, which is more appropriate for estimating dynamic growth models like the one we consider in this study. Survey of the literature shows that many existing empirical studies on fiscal deficits and economic growth employ techniques - such as, ordinary least square (OLS) technique, fixed-effects (FE) technique, random-effects (RE) technique, and others - which are likely to produce biased coefficient estimates for dynamic models. In addition, the GMM estimation technique controls for the likely endogeneity problem associated with growth models like ours. This problem can be difficult to deal with when other estimation techniques are used.

Finally, the study checks whether there exist any regional differences in relation to the deficit-economic growth connection in developing countries. This has not been considered in the existing panel studies on the topic despite the fact that, though there are many similarities, different regions of the developing world are not exactly homogenous in terms of economic characteristics and performance.

8.5 Problems and Limitations of the Study

As discussed in Chapter Four, the main problem and limitation this study faced related to data availability. Because of either non-reporting or lack of data on many variables, particularly fiscal variables, we considered in the empirical model, the number of developing countries included in the study was restricted to thirty-one only. Despite this problem, we carefully tried to ensure that the sample is 'representative' of developing countries by including countries from different income groups and regions of the developing world to allow drawing generalisations of the results. In terms of regions, for example, the sample includes 9 countries from Asia and the Pacific, 9 countries from America and the Caribbean, 5 countries from the Middle East and North Africa, and 8 countries from Sub-Saharan Africa.

Poor data availability also restricted the scope of analysis in some parts. For example, despite our awareness of the importance of governance variable in modelling economic growth, we were forced to omit this variable from our empirical model due to the lack of data on this variable for the large part of our sample period for developing countries. Also, lack of disaggregated data on the sources of deficit financing limited our analysis of the growth effects of the alternative sources of deficit financing to two broad sources only, domestic financing and external financing. In addition, poor data availability forced us to consider the economic growth effects of only five components of sectoral spending, instead of the eight components we could categorise.

Another limitation was that, as discussed earlier in Chapter Four (Section 4.4), the methodology of construction and classification of fiscal variables in the primary source of fiscal data - *IMF's Government Finance Statistics* - changed in 2001 and data on fiscal variables based on the new methodology and classification are not reported or consistently available for most of the developing countries. As a result, the sample period in our study covers the period from 1972 up to 2001 only, with the data for the most recent period (from 2002 to date) missing. Nevertheless, we believe the policy implications of the results are still relevant for the period after 2001, given that the general trends of most of the variables included in our empirical model have broadly remained unchanged since 2001.

Finally, poor quality of data also posed some limitations in the study. It is well documented in the literature that the quality of data from the primary sources of our data - *World Bank's World Development Indicators* and *IMF's Government Finance Statistics* - is not optimal especially for most of the developing countries[73]. Thus, regression results estimated using these data might be unreliable in terms of the magnitudes of the coefficients, hence the need to exercise caution with interpreting the results especially when making comparisons and generalisations. To address this problem, our analysis focused much on the direction and significance of the results on the explanatory variables included in the empirical model - and less on the magnitudes of the coefficients.

[73] However, it should be noted that these two are the best sources of statistical data available for economic analysis.

8.6 Areas for Future Research

Finally, we close our discussion with the identification of some potential areas for future research. These areas are proposed based on the reflection of our research process, study's problems and limitations, and some of the key findings. These are as outlined below:

- One possible study would be to re-examine the issues we have considered in this study using the updated data set that include the most recent data and more countries, when this is possible. In particular, it would be valuable to use the most recent dataset on fiscal variables that is constructed based on the new methodology and classification of fiscal variables used in the IMF's GFS since 2001.

- Another possible area for future research would be to carry out regional studies or studies based on individual countries to check whether this study's findings hold. Besides, one may argue that, although developing countries have a lot in common in terms of economic characteristics, there are some regional and country differences which may call for the need to conduct some regional or country specific studies in order to formulate more appropriate regional and/or country research informed economic policy. One may also argue that, simply formulating and implementing one-size-fits-all policies for all developing countries based on findings and policy implications drawn from studies considering a general set of developing countries like ours may be misleading.

- In addition, since most of the studies investigating the impact of fiscal deficits on economic growth consider the fiscal deficits per se only, there is a need for thorough empirical investigation into the specific questions of how the alternative ways of deficit financing and what deficit financing is used for in the economy influences economic growth. Our study has attempted to address these questions, but poor data availability has limited our scope of investigation into these issues. For example, poor data availability on deficit financing forced us to consider the impact of two broad classifications of deficit financing – domestic financing and external financing – on economic growth. However, it would be useful to examine the impact of disaggregated modes of deficit financing – printing money, domestic borrowing, foreign borrowing and running down foreign exchange reserves – on economic growth, when this is possible. Note also that poor data availability and quality forced us to consider the impact of five components of sectoral spending only, instead of considering all identified eight components. Thus, it would also be useful to re-examine the economic growth impact of all components of sectoral spending, when it is possible to get more consistent and reliable data on all components of sectoral spending.

- Furthermore, given our weak results on the impact of fiscal policy variables – i.e., fiscal deficits, components of government expenditure and grants - on economic growth, it would be useful to investigate why this is the case, and to what extent the role of governance and public sector efficiency could explain this weak relationship between fiscal policy and economic growth.

- In line with the previous point, it would also be useful to re-examine the impact of fiscal policy variables - particularly fiscal deficits and government expenditure – on economic growth using a modified version of our empirical model that includes the governance variable(s) on the right-hand side of the model. This could help to check the validity of our argument that our weak results on the impact of fiscal policy variables on economic growth could be explained by poor governance, which is a problem facing most of the developing countries. Note that, as discussed earlier, we could not include a governance variable in our empirical model due to poor data availability on governance indicators. However, it would be worth examining how adding a governance variable - as measured by indicators such as government effectiveness, voice and accountability, political stability or instability, rule of law and quality of institutions, corruption, quality of regulation - in the empirical model would influence the results on the effect of fiscal policy variables on economic growth.

- Finally, in the light of our empirical results on the control variables, it would be worth investigating further into the unexpected results we find of a positive impact of inflation and tax revenue on economic growth in developing countries. Note that both economic theory and intuition suggests that these variables should have a negative impact on economic growth especially in the economies with high rates of inflation and tax rates like the ones we have considered in this study.

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APPENDICES

Appendix A: Philosophical Approach of the Study

There are various philosophical approaches available for social scientists to choose from, depending on the *ontological assumptions* (i.e., assumptions that a particular approach to social science inquiry makes about the nature of social reality), and the *epistemological assumptions* - i.e., assumptions made about the ways in which it is possible to gain knowledge of this reality (Blaikie, 1993; May 1997).[74]

One influential philosophy in the practise of social science research corresponds to *falsificationism*, which is associated with British Philosopher Sir Karl Popper (Blaikie, 1993). This philosophy establishes that science progresses when a theory is proved wrong and a new theory which explains the phenomenon in a better way is developed (Chalmers, 1982). This philosophy, therefore, requires social scientists to attempt to disprove a theory and establish some evidence that contradicts it rather than simply attempting to prove it. Once the theory has been proved wrong (rejected) it is then falsified and stays that way. According to this philosophy, when this happens, scientists should not respond by using immunising stratagems, which *are ad hoc* theory adjustments designed to save theories from refutations, but rather they should see this as evidence of progress (Popper, 1959; Grunbaum, 1976; Chalmers, 1982; Blaug, 1992; Blaikie, 1993).

Popper's falsificationist approach sets out the following two requirements for scientific research (Popper, 1959, 1995; Blaikie, 1993). First, for any theory to be regarded as scientific it must be possible to falsify it – that is, it should be possible to use evidence to challenge it. According to this approach, a theory that is not capable of being tested should not be considered scientific, and a good theory is falsifiable because it makes definite claims about the world and the more precisely

[74] See Blaikie (1993, Chapters 4 and 7) for the review and critique of these approaches and the discussion on how to choose between them and May (2007, Chapter 1) for the survey of the main philosophical approached used in social sciences.

a theory is tested the more falsifiable it becomes (Blaikie, 1993, p. 145). Secondly, tests to theories should be as demanding as possible, so that a theory that survives such tests must be more acceptable than those subjected to weaker tests.

The falsificationism approach follows the *deductive strategy in research* (also referred to as the hypothetical deductive, or the method of conjecture and refutation). This strategy begins with a question or a problem that needs to be understood or explained, and then falsifiable hypotheses are proposed and then tested. In the words of Blaikie (1993)

> *"Science starts with problems, problems associated with the explanation of the behaviour of some aspect of the world or universe. Falsifiable hypotheses are then proposed by scientists as solutions to the problem. The conjectured hypotheses are then criticised and tested. Some will be quickly eliminated. Others might prove more successful. These must be subject to even more stringent criticism and testing. When a hypothesis that has successfully withstood a wide range of rigorous tests is eventually falsified, a new problem, hopefully far removed from the original solved problem, has emerged. This problem calls for the invention of a new hypothesis, followed by new criticism and testing. And so the process continues indefinitely. It can never be said of a theory that it is true, however well it has withstood rigorous tests, but it can hopefully be said that a current theory is superior to its predecessors in the sense that it is able to withstand tests that falsified those predecessors."* (Blaikie, 1993: p. 144: Citing Chalmers 1982: p. 45)

It follows from the above discussion that Popper's research strategy can be summarised as follows:

1. *Research should start by putting forward a tentative idea, a conjecture, or a hypothesis or a set of hypotheses that form a theory.*

2. *With the help of previously accepted hypotheses, or by specific conditions under which these hypotheses are expected to hold, a conclusion or a number of conclusions should be deduced.*

3. *Deduced conclusion or conclusions and the logic of the argument that produced the conclusion or conclusions should then be examined. These can be compared with existing theories to see if they would constitute an advance in understanding of the phenomenon under examination. If, satisfied with this examination, then…….*

4. *……. Proceed with testing of the conclusion or conclusions by collecting appropriate data and then conducting the necessary experiments.*

5. *If the test fails (i.e., if the data are not consistent with the conclusions), the 'theory' should be regarded as false; that is, the original conjecture should be seen as not match up with reality and must therefore be rejected.*

6. *If, however, the conclusion passes the test (i.e., the data are consistent with the theory), the 'theory' is temporary supported: it is 'corroborated', not 'proved to be true'.* (Blaikie, 1993: p. 145: Citing Popper, 1959: pp. 32-33)

While Popper's view of scientific research has gained acceptance from many social science researchers, there are features of it with which some researchers are dissatisfied and which makes it rarely practised. Economics as an area of social science research is one of the social sciences areas this methodology has influenced, but where it has rarely been practised. This is discussed in Blaug's (1992) study on "the methodology of economics, or how economists explain", in which he concludes that while methodological writings of different economists reveal the influence of falsificationism, modern economists rarely practise it. Blaug further argues that the prevailing economic methodology can be described as 'innocuous falsificationism' as it is not only highly protective of economic theory, but also ultrapermissive with some limits. Most models will do this, provided they are rigorously formulated and constructed, and promising in their relevance to the real world situation (Blaug, 1992: pp. 110-111)

Indeed, if Popper's falsificationism methodology were strictly followed, then it would not take long before most of the social science theories are falsified. Popper himself seemed to recognise this limitation. While in his early work he regarded a single refutation as being sufficient for the demise of a theory, he later allowed theories to be modified in order for them to survive tests (Blaikie, 1995). This did not mean introducing *ad hoc* modifications that had no testable consequences, such as an extra condition that arbitrarily restricted the scope of the theory, but it did allow necessary and testable conditions to be introduced.

Popper's view of science has come to be known as *naïve falsificationism*. Lakatos (1970) attempted to improve Popper's methodology by introducing what he called *sophisticated falsificationism*. He moved the emphasis away from establishing the level of falsifiability of a single theory to the comparison of the degree of falsifiability of competing theories. His approach establishes that, for a new theory to be acceptable it needs to be more falsifiable than its predecessor and preferably be able to predict new kinds of phenomenon. Thus, as science progresses, theories should become increasingly more falsifiable by making greater claims than their predecessors make. In the words of Blaikie (1992):

> *"Sophisticated falsificationism differs from naïve falsificationism both in its rules of acceptance (or 'demarcation criterion') and its rules of falsification or elimination. For the naïve falsificationist any theory which can be interpreted as experimentally falsifiable is 'acceptable' or 'scientific'. For the sophisticated falsificationist a theory is 'acceptable' or 'scientific' only if it has corroborated excess empirical content over its predecessor (or rival), that is, only if it leads to the discovery of novel facts*." (Blaikie, 1992: p. 147: cited from Lakatos, 1970: p. 116)

Sophisticated falsificationism establishes that for a theory to be replaced, the new theory must provide additional information, i.e. it must be able to predict facts that the existing theory would regard as improbable or not allowed; it must be able to explain what the existing theory can explain, and there must be some corroboration for this additional information.

Sophisticated falsificationism allows for *confirmationism* as well as *falsificationism* approaches, with the distinction between the two resting partially on the degree to which theories are severely tested to yield risky implications liable to refutation and partially on whether refutations are taken seriously as possible reflections of fundamental errors.

The methodology of *confirmationism* offers an approach that most present-day economists favour. This is revealed in the study cited above by Blaug (1992) on 'the methodology of economics or how economists explain' in which he argues that modern economists believe that "the theories should be testable; that a useful means of testing is to compare the predictions of a theory with reality; that predictive adequacy is often the most important characteristic a theory can possess; and that the relative ordering of theories should be determined by the strength of confirmation, or corroboration, of those being compared" (Blaug, 1992: xiv). According to Blaug (1992), these principles define the methodology of confirmationism rather than falsificationism.

In light of the above, therefore, our study follows the methodology of *confirmationism* in examining the impact of fiscal deficits on economic growth in developing countries, as it does not intend to falsify the existing theoretical predictions on the relationship between deficit spending and growth. If the results are in favour of the predictions, then there will be a confirmation or corroboration of the theory; and if not, instead of falsifying the theory, the study will look at the possible causes of the results that contradict the theory.

The study begins with setting a theoretical model based on the deductions from existing theories on the deficit-growth connection. This model and its theoretical predictions are then tested quantitatively using regression analysis.

The analysis of quantitative data is methodologically classified as quantitative research. This approach to research has been partly linked to positivism and partly to a general commitment to the practices of natural sciences. This is well discussed in Von Mises (1970) in which it is argued that some social science researchers are intent upon quantification of economics and their motto is the positivistic approach that scientific inquiry should deal with measurement. Von Mises further argues that these social science researchers try to compute the arithmetical relations among various data and thus to determine what they call, in similarity to natural sciences, correlations and functions. Given this description of quantitative research, therefore, we would classify our study as indeed a quantitative one as it seeks to establish a quantitative relationship between fiscal deficits and economic growth. However, as mentioned above, we emphasise that if our empirical results are in favour of the theoretical model and its predictions, then the study will confirm or corroborate the theory. On the other hand, however, if the results are not in line with theory then, instead of the study falsifying the theory, the study will look at the possible causes for the results that contradict it.

Appendix B: Theoretical Aggregation of Functional Classification of Taxes and Government Expenditure by Kneller et al. (1999)

Theoretical Classification	Functional Classification
Distortionary taxation	Taxation on income and profit
	Social security contributions
	Taxation on payroll and manpower
	Taxation on property
Non-distortionary taxation	Taxation on domestic goods and services
Other revenues	Taxation on international trade
	Non-tax revenues
	Other tax revenues
Productive expenditures	
	General public services expenditure
	Defence expenditure
	Education expenditure
	Health expenditure
	Housing expenditure
	Transport and communication expenditure
Unproductive expenditure	Social security and welfare expenditure
	Expenditure on recreation
	Expenditure on economic services
Other expenditures	Other expenditure (unclassified)

Source: Kneller, R. *et al.* (1999) Fiscal Policy and Growth: Evidence from OECD Countries, *Journal of Public Economics* 74, pp. 171-190
* Note: Function classification used here refer to the classification given in IMF's Government Financial Statistics – various issues.

Appendix C: Theoretical Functional Classification of Fiscal Policy Instruments by Benos (2009)

Theoretical Classification	Functional Classification
Distortionary taxation	Current taxes on income, wealth Capital taxes Actual social contributions
Non-distortionary taxation	Taxation on production and imports
Productive expenditures/ unproductive government expenditure	Expenditure on education Expenditure on health Expenditure on housing-community amenities Expenditure on environmental protection Education on social protection Expenditure on social protection Expenditure on economic affairs Expenditure on general public services Expenditure on public order-safety Expenditure on defence Expenditure on recreation-culture and religion

Source: Benos, N. (2009) Fiscal Policy and Economic Growth: Evidence from EU Countries, - Available from: <http://mpra.ub.uni-muenchen.de/19174/1/MPRA_paper_19174.pdf> [Accessed on 14th November 2011]

* Note: Function classification used here refer to the classification given in IMF's Government Financial Statistics – various issues.

Appendix D: Hypothesis Underlying the Formulations of the St. Louis Model Estimated by Andersen and Jordan (1968)

The specific hypothesis underlying the formulations of the St. Louis Model estimated by Andersen and Jordan (1968) is expressed in the following mathematical relation (Andersen and Jordan, 1968, p.24):

$$Y = f(E, R, M, Z) \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots \text{(i)}$$

Where: Y = total spending

E = a variable summarising government fiscal actions

R = a variable summarising government taxing actions

M = a variable summarising monetary actions

Z = a variable summarising all other factors that influence total spending

As discussed in Andersen and Jordan (1968), the time series data for E, R and M were considered in the model based on the argument that these are the indicators which are frequently used as measures of fiscal and monetary policy actions (Andersen and Jordan, 1968)

Expressing equation (i) in terms of the changes of each variable gives:

$$\Delta Y = f(\Delta E, \Delta R, \Delta M, \Delta Z) \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots \text{(ii)}$$

Estimating equation (ii) based on econometric analysis yields:

$$\Delta Y = \alpha_1 \Delta E + \alpha_2 \Delta R + \alpha_3 \Delta M + \alpha_4 \Delta Z \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots \text{(iii)}$$

Where: α_1, α_2, α_3 and α_4 are parameter estimates of the observed values of ΔY on the observed values of ΔE, ΔR, ΔM and ΔZ, respectively.

It is worth noting that there is no constant term in equation (iii) since the effect of all "all other factors" influencing total spending are summarised/captured by $\alpha_4 \Delta Z$. However, a constant is reported in the empirical results reported for each estimated equation in Andersen and Jordan (1968); where these constant terms are an estimate of α_4 times the average autonomous non-monetary and non-fiscal factors summarized in Z.

As pointed out by Andersen and Jordan (1968, p.24), it is possible in a complex market economy for monetary and fiscal actions to exert an indirect influence (in addition to a direct influence) on ΔY. This indirect influence would operate through ΔZ. To illustrate this, for example, one form of the relation between monetary and fiscal actions ΔZ would be expressed as:

$$\Delta Z = b_o + b_1\Delta E + b_2\Delta R + b_3\Delta M + \alpha_4\Delta Z \text{...} \quad (IV)$$

The empirical values of α_1, α_2, and α_3 which were estimated/reported in Andersen and Jordan (1968) represent both the direct and indirect influence of monetary and fiscal policy actions on total spending. Using ΔE as an example, the expression ($a_1 + b_1a_4$) would an estimate of α_1, the total influence of ΔE on ΔY. Of this total influence, the direct influence is a_1 and the indirect influence is b_1a_4.

Appendix E: Changes in the Methodology of Construction and Classification of Fiscal Variables in the IMF's Government Finance Statistics Since 2001

The methodology used for construction and classification of fiscal variables in the IMF's Government Finance Statistics (IMF's GFS) changed significantly in 2001 following modernisation and expansion of the methodology used in compiling government finance statistics. This methodology replaced (or improved on) the methodology used in compiling government finance statistics in accordance with the guidelines given in the 1986 Government Finance Statistics Manual. Major changes in the revised GFS system, as described in the *2001 GFS manual*, were made in the *coverage of units and economic events to be recorded*, *time/basis of recording economic events*, *definitions and classifications of revenue and expense* and *valuation* (IMF's GFS Manual, 2001, pp.156-159). These changes and differences from the 1986 GFS system are explained below:

- ***Coverage of units and economic events***

The focus of the coverage of units in the revised GFS system (2001 GFS system) is the *general government sector* as defined in the *System of National Accounts 1993* (1993 SNA)[75], which is defined on the basis of institutional units[76]. This is different from the coverage of the 1986 GFS system, which is defined on a *functional basis* (rather than institutional units) and includes all relevant transactions (i.e. transactions that represent the fulfilment of fiscal policy) of all units carrying out a function of government. One important implication of these changes on the coverage of units is that, while transactions relating to the governmental functions

[75] Defined and used as the international standard for compilation of national accounts statistics and for the international reporting of comparable national accounting data. This was adopted by the United Nations Statistical Commission in 1993, and it has since then been published jointly by the United Nations, the World Bank, the International Monetary Fund, the Organisation for Economic Co-operation and Development, and the Commission of the European Communities (http://unstats.un.org/unsd/nationalaccount/sna1993.asp.)

[76] Where, according to 2001 GFS Manual, institutional units are defined as economic entities that are capable, in their own right, of owning assets, incurring liabilities, and engaging in economic activities and in transactions with other entities (IMF's GFS Manual, 2001, p.8)

carried out within a country by supranational organisations[77] were included in compilation of statistics of each country in the 1986 GFS system, these transactions are now excluded in the revised GFS system. It should be noted that, despite the fact that supranational organisations fulfil some of the fiscal roles/functions of government within each member country, they are usually considered as non-resident institutional units. On this basis, therefore, they are not included in the revised GFS system for any country.

In addition, the coverage of economic events in the revised GFS system is broader than the coverage of events used in the 1986 GFS system. This follows a switch from *cash basis* to *accrual basis* of recording transactions and other economic flows under the revised system (*see discussion in the next section*), which means that all economic events that affect revenue, expenses, assets or liabilities rather than just those represented by cash transactions are included in recording transactions and other flows.

- ***Time/basis of recording economic events***

In the revised GFS system, transactions and other economic flows are recorded on *accrual basis*. As a result, transactions and flows are recorded when economic value is *created, transformed, exchanged, transferred or extinguished* (IMF's GFS 2001, p.156). This is different from the approach followed in the 1986 GFS system in which transactions are recorded on *cash basis* – i.e. when cash is received or paid. Given these changes, transactions and economic flows are recorded at earlier time under the revised GFS system than under the 1986 GFS system.

[77] Defined in IMF's GFS Manuals as "international organisations that have been endowed with the authority to raise taxes or other compulsory transfers within the territories of the countries that are members of the authority" (IMF's GFS Manual, 2001, p.156).

- ***Definitions and classifications***

There are also changes in the definitions and classifications of revenue and expenditure in the revised GFS system. Revenue in the revised GFS system in an *increase in net worth* resulting from a transaction. As pointed out in the IMF's GFS 2001 manual (p.157), this implies that revenue includes grants but excludes proceeds from disposals of non-financial assets. Contrary to this definition of revenue under the revised GFS system, in the 1986 GFS system, revenue is considered as the set of all non-repayable government receipts other than grants, which means that revenue includes any proceeds from disposals of non-financial assets but excludes grants.

Similarly, expense in the revised GFS system is a *decrease in net worth* resulting from a transaction. It follows therefore that, since purchases of non-financial assets do not affect net worth, they are not considered as expense transactions. Note also that the term 'expense' in the revised GFS system replaces the term 'expenditure' used in the 1986 GFS system, for it is more closely associated with the accrual basis of recording transactions in the revised system and indicates that transactions in non-financial assets are excluded. In the 1986 GFS system, expenditure is defined as the set of all non-repayable payments and includes purchases of non-financial assets.

In terms of the classifications, revenues are substantially different in two GFS systems. Revenue in the revised GFS system is classified into *taxes*, *social insurance contributions*, *grants* and *other revenue*. In contrast, in the 1986 GFS system, revenue is classified as *tax*, *nontax*, or *capital revenue* - with *grants* forming a separate non-revenue category of government receipts.

Expense/expenditure is classified in two ways – by *function* and by *economic type* of transactions – in both the revised GFS system and the 1986 GFS system. The classification by function in both systems follow the *classification of Functions of Government* (COFOG) used by the United Nations, but this classification has recently been revised. The revised GFS system incorporates the revised COFOG while the 1986 GFS system follows the old COFOG. The classification of expense by economic type in the revised GFS system is broadly similar to the classification used in the 1986 GFS system, but with the following few exceptions:

- Purchases of non-financial assets are not considered as an expense in the revised GFS system.
- Consumption of fixed capital is considered as an expense in the revised GFS systems, while as a non-cash expense, this was excluded from the 1986 GFs system.
- Transfer payments are classified by type of payment in the revised GFS system, while in the 1986 GFS system these are classified by the sector receiving the payment.[78]

- ***Valuation***

In the revised GFS system, assets and liabilities are valued at current market prices, but with a provision of recording the nominal value of debt securities as a memorandum item. In the 1986 GFS system, debt securities are valued at the amount the government is supposed to pay when the debt matures. By implication, therefore, the valuation of debt securities the government is obligated to pay in the 1986 GFs system is most likely to differ from both the nominal value and the current market value of these debt securities.

- ***Other Changes***

Several other changes in the revised GFS system include:

- Complete balance sheets (which include all stocks of financial assets, non-financial assets, liabilities and net worth) are included in the revised GFS

[78] According to the IMF's GFS, the major types of transfer payments are *subsidies*, *grants* and *social benefits* (IMF's GFS Manual, 2001).

system, while in the 1986 GFS system only stocks of certain liabilities are included.

- Several new balancing items are introduced in the revised GFS system in the view that analysis of the government (or public) sector must include a variety of considerations and that no single measure is sufficient for all different purposes. In the 1986 GFS system, on the other hand, only one balancing item - the overall deficit/ surplus - is used.

- Transactions involving the purchase or sale of financial assets are treated as financial transactions and net lending/borrowing is one of the balancing items in the revised GFS system.

Following these methodological changes in compiling government finance statistics, many developing countries like the ones we have considered in our study - were not able, at least initially, to publish fiscal data using the revised GFS system, hence making it difficult to find consistent data for these countries for the period after 2001. This is not surprising, for even the IMF recognised that it would take some time before many countries are able to implement the revised GFS system as is pointed out in the 2001 Government Finance Statistics Manual:

> *"It is recognised that the implementation of the fully integrated GFS system presented in this manual will take some time and will need to progress at a pace determined by the differing needs and circumstances of the country involved. In particular, many countries will need to revise their underlying accounting systems to reflect the accrual accounting principles and revised classifications of the GFS system." (IMF's GFS Manual, 2001, p. 5)*

In fact, following delays by many developing countries to report government finance statistics in accordance with the guidelines of compiling government finance statistics given in the revised GFS system (2001 GFS), in September 2011, the IMF's Statistics Department introduced a new approach of assisting developing countries to be able to implement the integrated 2001 GFS system. This new approach is presented in recently published *Government Finance Statistics Compilation Guide for Developing Countries* (IMF, 2011). This guide recommends the following four stages of adopting the 2001 GFS system by developing countries (IMF, 2001, pp.186 – 187):

> *Stage one – introduction of the presentation tables and summary statements, and classification in accordance with 2001 GFS system of existing budget execution data only. This is referred to as the adoption of the 2001 GFS system.*
>
> *Stage two – expansion of the institutional and transactional coverage of government finance statistics to include all general government units, on a cash basis.*
>
> *Stage three – expansion of the coverage of the government finance statistics to include selected non-cash items. This is referred to as compiling government finance statistics on a modified cash basis; and*
>
> *Stage four – expansion of the coverage of government finance statistics to cover all flows and stocks associated with general government units – i.e. compilation of GFS on both a cash basis and an accrual basis for the whole government sector and its subsectors.*

Clearly, this shows that it will take some time before most of the developing countries are able to adopt and implement the fully integrated 2001 GFS system.

Appendix F: Sample Countries

Bhutan, Burkina Faso, Cameroon, Chile, Colombia, Costa Rica, Dominican Republic, Egypt, India, Indonesia, Iran, Kenya, Lesotho, Malaysia, Mauritius, Mexico, Morocco, Nepal, Pakistan, Panama, Papua New Guinea, Paraguay, South Africa, Sri Lanka, Syria Arab Republic, Thailand, Tunisia, Uruguay, Venezuela, Zambia and Zimbabwe.

Appendix G: Data Summary

Variable	Mnemonic	Observations	Mean	Standard Deviation	Minimum	Maximum
GDP growth	GDP	184	4.29	2.76	-3.34	11.40
Population growth	POP	186	2.22	0.696	0.19	3.82
Degree of openness	OPEN	183	4.018	0.52	2.37	5.35
Rate of Inflation	INFL	179	2.39	0.85	-0.59	4.57
Total investment	INV	181	3.05	0.28	2.26	3.86
Money Supply	M2	182	3.48	0.47	2.23	4.52
Total Fiscal Deficit	DFCT	183	3.48	3.58	-4.40	14.32
Domestic Financing	DFIN	172	2.42	2.94	-3.13	11.23
External Financing	EXTFIN	172	1.42	1.88	-2.24	7.56
Total Government expenditure	GOVEXP	181	3.13	0.37	2.09	3.91
Government Current expenditure)	CURREXP	176	2.89	0.39	1.91	3.60
Government Capital Expenditure	CAPEXP	175	1.49	0.67	-0.29	2.88
Expenditure on Public Service	PSEXP	164	0.84	0.75	-0.67	2.44
Defence expenditure	DEFEXP	147	.63	.78	-1.52	2.18
Spending on Education	EDUEXP	164	1.15	0.65	-1.40	2.16
Spending on Health	HLTHEXP	164	0.23	.74	-1.49	1.61
Spending on Economic Services	ECONEXP	163	1.51	0.62	-0.11	2.82
Total tax Revenue	TAX	182	16.37	5.77	5.02	32.61
Grants	GRANTS	139	-.976	1.98	-7.33	3.34

Source: Author's calculations based on data from World Development Indicators CD-ROM and IMF's Government Finance Statistics CD-ROM and Yearbooks (Various issues)

Note:
- All figures are calculated based on five-year averages
- All the variables are in natural logarithm except GDP, GDP_{-1}, DFCT, DFIN, EXTFIN and TAX
- All the original figures on fiscal variables, investment and money supply are expressed as a percentage of GDP